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FROM
**THE BUSINESS
HISTORICAL
SOCIETY INC**



THE GIFT OF
D. M. Ashbridge

WAR DEPARTMENT : : OFFICE OF THE SECRETARY

EIGHTH ANNUAL
REPORT OF THE

U. S. PHILIPPINE COMMISSION, 1900 - 1916

TO THE SECRETARY OF WAR

1907

APPENDIX

PUBLIC LAND LAWS
NOTES ON AGRICULTURE
NOTES ON LABOR



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GOVERNMENT PRINTING OFFICE

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APPENDIX.

COMPILATION OF LAWS AND REGULATIONS RELATING TO PUBLIC LANDS IN THE PHILIPPINE ISLANDS.

FEBRUARY 1, 1908.

LAWS AND REGULATIONS RELATING TO PUBLIC LANDS IN THE PHILIPPINE ISLANDS.

AREA OF THE PUBLIC DOMAIN IN THE PHILIPPINE ISLANDS.

The first Philippine Commission, usually known as the Schurman Commission, in its report states (Part IV, p. 91):

"It has been impossible to obtain accurate data or information with reference to the public lands and other public property belonging to the Spanish Government as sovereign in the archipelago. * * * From general information gathered from various sources, particularly from natives acquainted with the provinces, the opinion has been formed that the public domain in the archipelago is very large. Some place it as high as one-half of the area of the archipelago.

"For the most part these lands are in the more remote and inaccessible portions of the islands, being the mountains, the uplands, and other lands more or less remote from means of communication. It is said, for instance, that of the province of La Union, which, with respect to mountains, uplands, and remote lands, may be taken as an average mountain province, one-half is public domain. These lands are wild and wooded, in many cases with valuable growing timber standing upon them. The mines of coal, iron, copper, gold, and other mineral deposits, which by many are believed to abound in the islands, are in a large measure, it is said, to be found upon this public domain. So far as has been learned, the surveys of this land have been meager and very incomplete. When proper means of communication have been developed and proper measures adopted for taking advantage of the benefits of these lands they will doubtless form a large reserve source for the benefit of the government of the islands."

The first report of the Taft Commission, which bears date of November 30, 1900, contains the following statement relative to the public lands: "The total amount of land in the Philippine Islands is approximately 29,694,500 hectares, or 73,345,415 acres. Of this amount it is estimated that about 2,000,000 hectares, or about 4,940,000 acres, are owned by individuals, leaving in public lands 27,694,500 hectares, or 68,405,415 acres. The land has not been surveyed and these are mere estimates. Of the public lands there are about twice or three times as much forest land as there is waste land. The land is most fertile and for the greater part naturally irrigated. There was a very great demand for this land, but owing to the irregularities, frauds, and delays in the Spanish system, the natives generally abandoned efforts to secure a good title and contented themselves with remaining on the land as simple squatters, subject to eviction by the State. In 1894 the Minister for the Colonies reported to the Queen of Spain that there were about 200,000 squatters on the public lands, but it is thought by employees in the forestry bureau, who have been in a position to know, that there are fully double that number. In the various islands of the archipelago the proportion of private land to public land is about as stated above, except in Mindanao, Mindoro, and Palawan (Paragua), where the proportion of public land is far greater."

Capt. George P. Ahern, in charge of the Bureau of Forestry in the Philippines, in his annual report dated July 30, 1901, in speaking of the area of forest lands says:

"The Philippine Islands lie between 4° 45' and 21° north latitude and between 116° and 127° east longitude, with an area of 119,542 square miles. The islands are all mountainous, some of the high peaks having an altitude close to 9,000 feet above the sea. In many of the islands the steep mountain slopes

begin close to the seacoast, and to the casual observer the entire area is woodland. It has been estimated that of the 73,000,000 acres in the islands more than 6,000,000 are under cultivation. (Jordana, 1890.)

"We find various estimates for the forest area by former officials.

"The official geographic statistics of 1876 fix the forest area at 51,537,243 acres.

"Fernando Castro estimated the forest area in 1890 at 48,112,920 acres. This includes all woodland, private as well as public land.

"As one travels over the islands he is constantly struck with the large population to the square mile and the scarcity of timber close to the main traveled routes and centers of population. As one leaves the main traveled routes vast virgin forests are met with, rich in valuable hard woods, dyewoods, gums, and other products, waiting for the skill and enterprise of the American capitalist. On the island of Cebu, where we find a population of 290 to the square mile, not a merchantable stick of timber is evident, with the exception of a small tract of forest left in the northern end of this island, which forest must therefore be carefully looked after.

"The island of Panay, with a population of 150 to the square mile, is almost denuded of good timber. In Luzon, where the population averages 78 to the square mile, we find no timber in the vicinity of centers of population. As we travel over the only line of railway in the islands, from Manila to Dagupan, a distance of 120 miles, we fail to see a single merchantable stick within several miles of the road; but there are tracts in various parts of Luzon where much valuable timber remains. In the northern end of the island, in Cagayan and Isabela provinces, there are at least 2,000,000 acres of valuable forest remaining. The entire east coast of Luzon, from the northern end as far south as Atimonan, comprising several million acres, is practically a virgin forest. In northwestern Luzon very little merchantable timber is left, with the exception of the slopes above 3,000 feet, where we found a species of pine (*Pinus Insularis*) flourishing, all ages mingled together. The maximum pines seen were close to 4 feet in diameter and more than 100 feet in height. Here the pine obtains a diameter of 12 inches in about twenty years. Almost every acre of these northwestern mountains is burnt over each year by the savages, but the larger pines seem to survive these repeated scorplings. Through central Luzon the timber has been cut away, leaving small tracts of fairly good forest in a few places. In southern Luzon, in Tayabas, and the Camarines, we find some large tracts fairly well covered with a variety of valuable tree species.

"As we enter the southwestern islands, extending from Mindoro through to Paragua, we leave the more traveled routes and find a sparsely settled region where the virgin forests have been apparently untouched. In this group you will find upward of 4,000,000 acres of virgin forest extending from the water's edge to the summits of the mountains. Some cutting has been done in this region, but it has amounted to a mere thinning of the edges of the forest. This group of islands is celebrated for the great quantity of narra, or Philippine mahogany, molave, ipil, and calantas (the Philippine cedar). Here we find valuable hard woods 4 or 5 feet in diameter with magnificent clear trunks for 80 feet up to the first limb. As a rule we find all over the islands that the largest trees have not been felled, owing to the lack of facilities for handling heavy timbers. Very little cleared land is found in Mindoro. Its reputation as a death trap for white men will change, as a few hundred square miles are cleared of timber and its rich soil devoted to agriculture. A vigorous thinning of at least 50 per cent of the present forest growth of Mindoro and Paragua would make them much more salubrious than at present. The island of Mindanao, with an area of more than 23,000,000 acres, is almost entirely covered by forest. The vast majority of the population of this island is found in coast towns, with the exception of the region in the north surrounding the Laguna de Lanao, where we find a large population of Moros. Very little timber has been cut in this island, owing to the scarcity of labor and the distance to market. It would be safe to estimate at least 10,000,000 acres of virgin forest for this island alone. The southern part of this island, in the region southeast of Cotabato, is noted for its gutta-percha, rubber, and other gums. More than \$300,000 was paid at Cotabato for these gums last year, all of which product was shipped to Singapore. There are a number of rivers in this island sufficiently large for log-driving purposes.

"Of the other larger islands we find valuable forests in the islands of Leyte and Samar. The island of Negros has been cut over rather thoroughly for a

great many years, and it will not be long before it will be in the same condition as the island of Cebu, if the forests are not protected. This island (Negros), prior to June, 1901, was under a separate government with its own forestry service. The forestry bureau at Manila now has jurisdiction in this island, and will promptly introduce the forestry officials trained at Manila, enforce there the forestry regulations, and protect what is left of their forests. We may safely estimate that there are at least 20,000,000 acres of virgin forest in these islands, with an average of at least 15,000 feet board measure of valuable hard wood to the acre.

"Up to the present date the Bureau has listed 665 native tree species, of several hundred of which little more is known than their names. During the past year about 160 different native woods have entered the market, the most valuable of which for construction purposes is molave. Molave, ipil, yacal, and dungon are remarkable for their durability and strength. The qualities of a few of these woods are very well known to the natives, and the specifications for the main timbers in house construction carefully provide that the timbers used shall be some of these mentioned. In addition to their value in ordinary construction they have exceptional qualities when used as paving blocks. Two of the bridges in Manila were paved with molave blocks about six years ago, have been subjected to the heaviest traffic in the city, and, apparently, at the present date, not a single block has been splintered. The calantas, or Philippine cedar, is almost entirely used in making cigar boxes. Narra, tindalo, acle, and luan are used principally as furniture woods. Betis, aranga, and dungon are generally used as piles, for which there is a great demand in the Manila market. The other important construction woods are baticulin, batitinan, amuguis, guljo, apitong, panao, sacat, balacat, malabulac, and malasantol."

NOTES ON GEOGRAPHY AND POPULATION IN THE PHILIPPINES.

"Philippine Islands: Magellan landed in Cebu 1521; Manila occupied 1565 by Salcedo. Latitude 4° 45' north to 21° north; longitude 116° east to 127° east. Charts show 948 to 1,725 islands. Areas given by Philippine Commission, 110,542 square miles."

1874:	Acres.
Vidal-Area-Map-Coella	71,989,385
Map, Hydrographic Office.....	73,345,415
Per annual statement.....	73,009,495

Geographic statistics.

1876:	
Area	69,756,245
City property.....	432,625
Cultivated land.....	5,632,641
Uncultivated land.....	12,153,746
Forest land.....	51,537,243
1890:	
Jordana, area approximated.....	69,160,000
Area cultivated land.....	6,175,000
Fernando Castro, forest area.....	48,112,920
Land occupied by Moros and independent tribes.....	24,700,000

The chief of the bureau of public lands, in his annual report dated September 1, 1903, makes the following statement relative to the area of the public domain:

"Accurate information on this subject can not be furnished at the present time, because of the lack of a proper system of surveys and of any trustworthy data among the Spanish land titles in my custody.

"Nearly two years ago I made an examination of the writings of a number of Spanish officials who had served in the Philippines, and upon their statements estimated the total area of the islands at about 72,000,000 or 73,000,000 acres.

"The only information I have in regard to the area of lands now in private ownership is based upon statements of persons who were born in the islands and who were employed in the Inspección General de Montes, which office was the

predecessor, under the Spanish Government, of the present bureau of forestry. These persons estimated that the area in private ownership did not exceed 12,000,000 acres.

"Assuming the correctness of my estimate of 73,000,000 acres for the total area of the islands, that would leave 61,000,000 acres of land belonging to the public domain.

"The chief of the bureau of forestry estimates the forest lands on the public domain at about 40,000,000-acres. This would leave an area of 21,000,000 acres of land not forested, the most of which is agricultural in character, and which will be subject to disposal under the law permitting leasing, selling, and homesteading as soon as the act now awaiting the final action of the Commission shall have received the express or implied sanction of Congress."

The latest estimates of the area of the Philippine Islands are those contained in the recent census, and were calculated by Mr. George R. Putnam of the United States Coast and Geodetic Survey, and are as follows:

NUMBER OF ISLANDS HAVING AN AREA OF—

10,000 square miles or more.....	2
1,000 square miles or more and less than 10,000 square miles.....	9
100 square miles or more and less than 1,000 square miles.....	20
10 square miles or more and less than 100 square miles.....	73
1 square mile or more and less than 10 square miles.....	262
0.1 square mile or more and less than 1 square mile.....	728
Less than 0.1 square mile.....	2,046
Total	3,141

Total area of the Philippine Islands 115,026 square statute miles.

Islands of the Philippine Archipelago having an area larger than 100 square miles.

Order.	Island.	Area.	Order.	Island.	Area.
		<i>Sq. m.</i>			<i>Sq. m.</i>
1	Luzon.....	40,909	17	Jolo.....	828
2	Mindanao.....	36,292	18	Dinabias.....	324
3	Samar.....	5,081	19	Dinagat.....	309
4	Negros.....	4,881	20	Tawi Tawi.....	232
5	Panay.....	4,611	21	Guimaras.....	228
6	Paragua.....	4,027	22	Burias.....	197
7	Mindoro.....	3,851	23	Billiran.....	190
8	Leyte.....	2,723	24	Sibuyan.....	171
9	Cebu.....	1,762	25	Cullion.....	153
10	Bohol.....	1,441	26	Siargao.....	151
11	Masbate.....	1,236	27	Samal.....	147
12	Catanduanes.....	682	28	Balabac.....	122
13	Basilan.....	478	29	Dumaran.....	122
14	Busuanga.....	390	30	Ticao.....	121
15	Marinduque.....	352	31	Siquijor.....	106
16	Polillo.....	333			

The above areas include, of course, all the land in the islands and give no information as to the amount of the public domain. From other data furnished by the census it is possible to arrive at the amount of land devoted to agriculture. In discussing the agricultural lands the census states:

"In most sections of the Philippine Islands the lands used for agriculture, located within the limits of territory having a Christian population, are greatly subdivided, and, consequently, individual holdings are frequently of very small areas. Nearly half the parcels of occupied lands to which the tables relate (49.8 per cent) are less than one hectare (2.471 acres) in size; while thousands of tracts, the total number of which constitutes 21.7 per cent of the holdings embraced by the tables are smaller than 35 ares, and are being equivalent to 0.0247 of an acre, or about 1,075 square feet. These small parcels of land, many of them no larger than ordinary kitchen gardens in the United States, are resided upon by, cultivated by, and contribute materially to the subsistence of their owners and occupants; and the presentation of agricultural statistics

for the Philippines would be extremely faulty and incomplete were they not included. They are, however, too small to be properly called 'farms.' For convenience, however, in discussing the tables, all agricultural holdings will be referred to as 'farms,' regardless of size.

"The people of the Philippines are extremely gregarious. The isolated farmhouse, so familiar in rural sections throughout the United States, is practically unknown in these islands, whose inhabitants almost universally live in communities and largely subsist on such products of the soil as can be cultivated or gathered from wild growths in the immediate vicinity of their dwelling places.

"This custom of herding together is not due alone to the social, company-loving disposition of the people. It has been rendered necessary by the ladronism and the raids of Moros that prevailed throughout the islands for centuries. The piratical Moros have, in earlier times, raided the islands as far north as Northern Luzon, until half a century ago Spain put a stop to it. These, with the marauding bands of ladrones that have infested the most productive portions of the archipelago, have rendered farm life, in the American sense, impracticable, and have forced the people to live in more or less closely settled communities for purposes of protection and defense against the incursions of the robbers. This has been one of the greatest obstacles in the way of agricultural development and is in a large degree the cause of the numerous small land holdings. Another reason is the great productiveness of the soil and the variety of crops that can be raised on a small piece of land.

"The spaces of land between their villages are, as a rule, unpopulated, and these intervening tracts, frequently of great extent, are almost wholly uncultivated and practically unused, except in a limited way for grazing purposes or in the utilization of such wild growths of fruits, vegetables, or fiber plants as they produce. The average size of all farms in the Philippines is only 546.8 acres, equivalent to 8.57 acres. In the United States the average size of all farms is shown by the census of 1900 to have been 146.6 acres, making a ratio as to size of about 17 to 1.

"The small proportion of land in farms or agricultural lands, as compared with the total areas of the various provinces, comandancias, and islands, is shown by the two following tables:

Total area and area of agricultural land, by provinces and comandancias, arranged in the order of the magnitude of the percentage of agricultural lands reported.

In order of magnitude.	Province or comandancia.	Area in hectares.*		Per cent agricultural.
		Total.	Agricultural.	
	Philippine Islands.....	29,791,734	2,827,704	9.5
1	La Laguna.....	162,911	86,426	51.1
2	Pampanga.....	224,812	105,677	47.0
3	Sorsogon.....	195,545	89,829	45.4
4	Pangasinan.....	308,987	119,771	38.8
5	Ilocos Sur.....	121,969	47,176	38.7
6	Batangas.....	311,059	117,422	37.7
7	Iloilo.....	524,998	176,955	33.7
8	Bulacan.....	303,807	90,220	29.7
9	La Union.....	164,206	48,077	29.2
10	Cebu.....	502,201	180,624	36.0
11	Cavite.....	180,321	40,831	22.5
12	Tarlac.....	312,066	78,923	25.3
13	Albay.....	461,797	116,064	25.1
14	Capiz.....	452,991	108,692	24.0
15	Negros Occidental.....	810,670	177,642	21.9
16	Abra.....	306,229	62,086	17.2
17	Leyte.....	779,072	133,620	17.2
18	Ilocos Norte.....	344,470	55,633	16.2
19	Nueva Beja.....	561,771	90,367	16.1
20	Bombon.....	149,407	23,546	15.9
21	Bohol.....	391,349	58,098	14.8
22	Manila City.....	5,180	738	14.2
23	Ambos Camarines.....	849,261	106,371	12.5
24	Cagayan.....	1,308,468	168,166	10.6
25	Antique.....	298,706	27,194	9.3
26	Zambales.....	560,375	45,917	8.3

* One hectare equals 2.471 acres.

Total area and area of agricultural land, by provinces and comandancias, etc.—
Continued.

In order of magnitude.	Province or comandancia.	Area in hectares.		Per cent agricultural.
		Total.	Agricultural.	
27	Negros Oriental.....	482,778	87,971	7.9
28	Rizal.....	180,847	14,787	7.8
29	Samar.....	1,866,484	201,481	7.4
30	Tayabas ^a	1,645,686	120,764	7.3
31	Misamis.....	978,243	59,299	6.1
32	Bataan.....	189,083	8,232	5.9
33	Isabela.....	1,269,662	67,716	5.3
34	Mindoro.....	1,042,216	42,424	4.1
35	Surigao.....	1,809,892	49,060	2.7
36	Masbate.....	406,371	9,798	2.4
37	Basilan ^b	184,680	2,276	1.7
38	Paragua.....	618,751	9,083	1.5
39	Zamboanga ^b	791,504	10,588	1.3
40	Dapitan ^b	521,885	5,874	1.0
41	Nueva Vizcaya.....	505,050	4,421	.9
42	Davao ^b	2,514,113	16,843	.7
43	Siassi ^b	23,051	133	.6
44	Lepanto-Bontoc.....	519,285	1,741	.3
45	Cotabato ^b	2,052,574	5,286	.2
46	Paragua Sur ^b	787,891	626	.1
47	Benguet.....	212,898	233	.1
48	Jolo ^b	142,450	23	(^c)
	Tawi Tawi ^b	106,600	(^d)	(^d)

^a Including the subprovince. Marinduque.
^b Comandancia.

^c Less than one-tenth of 1 per cent.
^d No agricultural land reported.

Total area and area of agricultural land, by islands, arranged in the order of the magnitude of the percentage of agricultural land.

In order of magnitude.	Island.	Area in hectares.		Per cent agricultural.
		Total.	Agricultural.	
	Philippine Islands.....	29,791,734	2,827,704	9.5
1	Cebu.....	456,358	119,989	26.3
2	Panay.....	1,194,249	294,487	24.7
3	Leyte.....	704,098	133,754	17.6
4	Marinduque.....	91,168	15,598	17.1
5	Negros.....	1,264,179	210,452	16.6
6	Luzon.....	10,610,971	1,592,238	15.1
7	Bohol.....	373,219	53,100	14.2
8	Samar.....	1,308,029	85,892	6.6
9	Mindoro.....	997,409	39,138	3.9
10	Masbate.....	320,124	5,222	1.6
11	Mindanao.....	9,300,628	127,584	1.4
	All other islands.....	8,076,402	100,190	5.2

These estimates reduced to acres give for the entire archipelago 73,615,374 acres, of which 6,987,256 were in farms. It is not known whether the land reported by the census as being in farms or agricultural lands includes all the land of private ownership, but comparing the census figures with the previous estimates given it would appear that most of the private land is thus included.

The three estimates that have been made of the lands in the islands, placed in tabular form, are as follows:

Authority.	Total area, in acres.	Public domain, in acres.
Taft Commission.....	73,845,415	68,406,415
Chief bureau public lands.....	73,000,000	61,000,000
Census estimate.....	73,615,374	66,628,118

It will be seen by reference to the table on page 5 that but one province, La Laguna, has over 50 per cent of land in farms, while the great island of Mindanao reports but 1.4 per cent of the land as being in farms.

ACTS OF CONGRESS AND THE PHILIPPINE COMMISSION.

CONGRESSIONAL LEGISLATION.

The Act of Congress approved July 1, 1902, entitled, "An Act temporarily to provide for the administration of the affairs of civil government in the Philippine Islands, and for other purposes," granted authority to the Philippine Commission to dispose of the public domain under the conditions set forth therein. The above Act was amended in certain sections by the Act of February 6, 1905, which changed the original measurements from acres, feet, etc., to the metric system of measurements, and the law as printed herewith includes all the legislation by Congress relative to the lands of the Philippine Islands at present in force.

All the Acts and regulations of the Philippine Commission are based upon these two Acts of Congress.

[PUBLIC—No. 235.]

AN ACT Temporarily to provide for the administration of the affairs of civil government in the Philippine Islands, and for other purposes, approved July 1, 1902, as amended by Public—No. 43, approved February 6, 1905.

* * * * *

SEC. 12. That all the property and rights which may have been acquired in the Philippine Islands by the United States under the treaty of peace with Spain, signed December tenth, eighteen hundred and ninety-eight, except such land or other property as shall be designated by the President of the United States for military and other reservations of the Government of the United States, are hereby placed under the control of the government of said islands to be administered for the benefit of the inhabitants thereof, except as provided in this Act.

SEC. 13. That the government of the Philippine Islands, subject to the provisions of this Act and except as herein provided, shall classify according to its agricultural character and productiveness, and shall immediately make rules and regulations for the lease, sale, or other disposition of the public lands other than timber or mineral lands, but such rules and regulations shall not go into effect or have the force of law until they have received the approval of the President and when approved by the President they shall be submitted by him to Congress at the beginning of the next ensuing session thereof and unless disapproved or amended by Congress at said session they shall at the close of such period have the force and effect of law in the Philippine Islands: *Provided*, That a single homestead entry shall not exceed sixteen hectares in extent.

SEC. 14. That the government of the Philippine Islands is hereby authorized and empowered to enact rules and regulations and to prescribe terms and conditions to enable persons to perfect their title to public lands in said Islands, who, prior to the transfer of sovereignty from Spain to the United States, had fulfilled all or some of the conditions required by the Spanish laws and royal decrees of the Kingdom of Spain for the acquisition of legal title thereto yet failed to secure conveyance of title; and the Philippine Commission is authorized to issue patents, without compensation, to any native of said Islands, conveying title to any tract of land not more than sixteen hectares in extent, which were public lands and had been actually occupied by such native or his ancestors prior to and on the thirteenth of August, eighteen hundred and ninety-eight.

SEC. 15. That the government of the Philippine Islands is hereby authorized and empowered, on such terms as it may prescribe, by general legislation, to provide for the granting or sale and conveyance to actual occupants and settlers and other citizens of said islands such parts and portions of the public domain, other than timber and mineral lands, of the United States in said islands as it

may deem wise, not exceeding sixteen hectares to any one person and for the sale and conveyance of not more than one thousand and twenty-four hectares to any corporation or association of persons: *Provided*, That the grant or sale of such lands, whether the purchase price be paid at once or in partial payments, shall be conditioned upon actual and continued occupancy, improvement, and cultivation of the premises sold for a period of not less than five years, during which time the purchaser or grantee can not alienate or encumber said land or the title thereto; but such restriction shall not apply to transfers of rights and title of inheritance under the laws for the distribution of the estates of decedents.

Sec. 16. That in granting or selling any part of the public domain under the provisions of the last preceding section, preference in all cases shall be given to actual occupants and settlers; and such public lands of the United States in the actual possession or occupancy of any native of the Philippine Islands shall not be sold by said government to any other person without the consent thereto of said prior occupant or settler first had and obtained: *Provided*, That the prior right hereby secured to an occupant of land, who can show no other proof of title than possession, shall not apply to more than sixteen hectares in any one tract.

Sec. 17. That timber, trees, forests, and forest products on lands leased or demised by the government of the Philippine Islands under the provisions of this Act shall not be cut, destroyed, removed, or appropriated except by special permission of said government and under such regulations as it may prescribe.

All moneys obtained from lease or sale of any portion of the public domain or from licenses to cut timber by the government of the Philippine Islands shall be covered into the insular treasury and be subject only to appropriation for insular purposes according to law.

Sec. 18. That the forest laws and regulations now in force in the Philippine Islands, with such modifications and amendments as may be made by the government of said islands, are hereby continued in force, and no timber lands forming part of the public domain shall be sold, leased, or entered until the government of said islands, upon the certification of the forestry bureau that said lands are more valuable for agriculture than for forest uses, shall declare such lands so certified to be agricultural in character: *Provided*, That the said government shall have the right and is hereby empowered to issue licenses to cut, harvest, or collect timber or other forest products on reserved or unreserved public lands in said islands in accordance with the forest laws and regulations hereinbefore mentioned and under the provisions of this Act, and the said government may lease land to any person or persons holding such licenses, sufficient for a mill site, not to exceed four hectares in extent, and may grant rights of way to enable such person or persons to get access to the lands to which such licenses apply.

Sec. 19. That the beneficial use shall be the basis, the measure, and the limit of all rights to water in said islands, and the government of said islands is hereby authorized to make such rules and regulations for the use of water, and to make such reservations of public lands for the protection of the water supply, and for other public purposes not in conflict with the provisions of this Act, as it may deem best for the public good.

MINERAL LANDS.

Sec. 20. That in all cases public lands in the Philippine Islands valuable for minerals shall be reserved from sale, except as otherwise expressly directed by law.

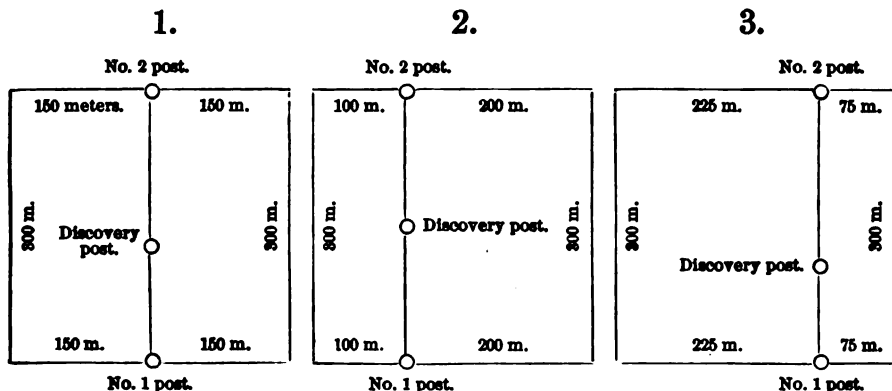
Sec. 21. That all valuable mineral deposits in public lands in the Philippine Islands, both surveyed and unsurveyed, are hereby declared to be free and open to exploration, occupation, and purchase, and the land in which they are found to occupation and purchase, by citizens of the United States, or of said Islands; *Provided*, That when on any lands in said Islands entered and occupied as agricultural lands under the provisions of this Act, but not patented, mineral deposits have been found, the working of such mineral deposits is hereby forbidden until the person, association, or corporation who or which has entered and is occupying such lands shall have paid to the Government of said Islands such additional sum or sums as will make the total amount paid for the mineral claim or claims in which said deposits are located equal to the amount charged by the Government for the same as mineral claims.

SEC. 22. (*As amended by act of Congress approved February 6, 1905.*) That mining claims upon land containing veins or lodes of quartz or other rock in place bearing gold, silver, cinnabar, lead, tin, copper, or other valuable deposits located after the passage of this Act, whether located by one or more persons qualified to locate the same under the preceding section, shall be located in the following manner and under the following conditions: Any person so qualified desiring to locate a mineral claim shall, subject to the provisions of this Act with respect to land which may be used for mining, enter upon the same and locate a plat of ground measuring, where possible, but not exceeding three hundred meters in length by three hundred meters in breadth, in as nearly as possible a rectangular form—that is to say, all angles shall be right angles, except in cases where a boundary line of a previously surveyed claim is adopted as common to both claims, but the lines need not necessarily be meridional. In defining the size of a mineral claim it shall be measured horizontally, irrespective of inequalities of the surface of the ground.

SEC. 23. (*As amended by act of Congress approved February 6, 1905.*) That a mineral claim shall be marked by two posts, placed as nearly as possible on the line of the ledge or vein, and the posts shall be numbered one and two, and the distance between posts numbered one and two shall not exceed three hundred meters, the line between posts numbered one and two to be known as the location line; and upon posts numbered one and two shall be written the name given to the mineral claim, the name of the locator, and the date of the location. Upon post numbered one there shall be written, in addition to the foregoing, "Initial post," the approximate compass bearing of post numbered two, and a statement of the number of meters lying to the right and to the left of the line from post numbered one to post numbered two, thus "Initial post. Direction of post numbered two . . . meters of this claim lie on the right and . . . meters on the left of the line from number one to number two post." All the particulars required to be put on number one and number two posts shall be furnished by the locator to the provincial secretary, or such other officer as by the Philippine Government may be described as mining recorder, in writing, at the time the claim is recorded, and shall form a part of the record of such claim.

SEC. 24. (*As amended by act of Congress approved February 6, 1905.*) That when a claim has been located the holder shall immediately mark the line between posts numbered one and two so that it can be distinctly seen. The locator shall also place a post at the point where he has found minerals in place, on which shall be written "Discovery post:" *Provided*, That when the claim is surveyed the surveyor shall be guided by the records of the claim, the sketch plan on the back of the declaration made by the owner when the claim was recorded, posts numbered one and two, and the notice on number one, the initial post.

"Examples of various modes of laying out claims."



NOTE.—See section 8 of Act No. 624 of the Philippine Commission (page 494), which requires corner posts in addition to above.

SEC. 25. (*As amended by act of Congress approved February 6, 1905.*) That it shall not be lawful to move number one post, but number two post may be moved by the deputy mineral surveyor when the distance between posts numbered one and two exceeds three hundred meters, in order to place number two post three hundred meters from number one post on the line of location. When the distance between posts numbered one and two is less than three hundred meters, the deputy mineral surveyor shall have no authority to extend the claim beyond number two.

SEC. 26. That the "location line" shall govern the direction of one side of the claim, upon which the survey shall be extended according to this Act.

SEC. 27. That the holder of a mineral claim shall be entitled to all minerals which may lie within his claim, but he shall not be entitled to mine outside the boundary lines of his claim continued vertically downward: *Provided*, That this Act shall not prejudice the rights of claim owners nor claim holders whose claims have been located under existing laws prior to this Act.

SEC. 28. That no mineral claim of the full size shall be recorded without the application being accompanied by an affidavit made by the applicant or some person on his behalf cognizant of the facts—that the legal notices and posts have been put up; that mineral has been found in place on the claim proposed to be recorded; that the ground applied for is unoccupied by any other person. In the said declaration shall be set out the name of the applicant and the date of the location of the claim. The words written on the number one and number two posts shall be set out in full, and as accurate a description as possible of the position of the claim given with reference to some natural object or permanent monuments.

SEC. 29. (*As amended by act of Congress approved February 6, 1905.*) That no mineral claim which at the date of its record, is known by the locator to be less than a full-sized mineral claim, shall be recorded without the word "fraction" being added to the name of the claim, and the application being accompanied by an affidavit or solemn declaration made by the applicant or some person on his behalf cognizant of the facts: That the legal posts and notices have been put up; that mineral has been found in place on the fractional claim proposed to be recorded; that the ground applied for is unoccupied by any other person. In the said declaration shall be set out the name of the applicant and the date of the location of the claim. The words written on the posts numbered one and two shall be set out in full, and as accurate a description as possible of the position of the claim given. A sketch plan shall be drawn by the applicant on the back of the declaration, showing as near as may be the position of the adjoining mineral claims and the shape and size, expressed in meters, of the claim or fraction desired to be recorded: *Provided*, That the failure on the part of the locator of a mineral claim to comply with any of the foregoing provisions of this section shall not be deemed to invalidate such location if, upon the facts, it shall appear that such locator has actually discovered mineral in place on said location and that there has been on his part a bona fide attempt to comply with the provisions of this Act, and that the nonobservance of the formalities hereinbefore referred to is not of a character calculated to mislead other persons desiring to locate claims in the vicinity.

SEC. 30. That in cases where, from the nature or shape of the ground, it is impossible to mark the location line of the claim as provided by this Act then the claim may be marked by placing posts as nearly as possible to the location line, and noting the distance and direction such posts may be from such location line, which distance and direction shall be set out in the record of the claim.

SEC. 31. (*As amended by act of Congress approved February 6, 1905.*) That every person locating a mineral claim shall record the same with the provincial secretary, or such other officer as by the Government of the Philippine Islands may be described as mining recorder of the district within which the same is situate, within thirty days after the location thereof. Such record shall be made in a book to be kept for the purpose in the office of the said provincial secretary or such other officer as by said Government described as mining recorder, in which shall be inserted the name of the claim, the name of each in meters, the date of location, and the date of the record. A claim which shall not have been recorded within the prescribed period shall be deemed to have been abandoned.

SEC. 32. That in case of any dispute as to the location of a mineral claim the title to the claim shall be recognized according to the priority of such loca-

tion, subject to any question as to the validity of the record itself and subject to the holder having complied with all the terms and conditions of this Act.

Sec. 83. That no holder shall be entitled to hold in his, its, or their own name or in the name of any other person, corporation, or association more than one mineral claim on the same vein or lode.

Sec. 84. That a holder may at any time abandon any mineral claim by giving notice, in writing, of such intention to abandon, to the provincial secretary or such other officer as by the Government of the Philippine Islands may be described as mining recorder; and from the date of the record of such notice all his interest in such claim shall cease.

Sec. 85. That proof of citizenship under the clauses of this Act relating to mineral lands may consist in the case of an individual, of his own affidavit thereof; in the case of an association of persons unincorporated, of the affidavit of their authorized agent, made on his own knowledge or upon information and belief; and in case of a corporation organized under the laws of the United States, or of any State or Territory thereof, or of the Philippine Islands, by the filing of a certified copy of their charter or certificate of incorporation.

Sec. 86. (*As amended by act of Congress approved February 6, 1905.*) That the United States Philippine Commission or its successors may make regulations, not in conflict with the provisions of this Act, governing the location, manner of recording, and amount of work necessary to hold possession of a mining claim, subject to the following requirements:

On each claim located after the passage of this Act, and until a patent has been issued therefor, not less than two hundred pesos' worth of labor shall be performed or improvements made during each year: *Provided*, That upon a failure to comply with these conditions the claim or mine upon which such failure occurred shall be open to relocation in the same manner as if no location of the same had ever been made, provided that the original locators, their heirs, assigns, or legal representatives have not resumed work upon the claim after failure and before such relocation. Upon the failure of any one of several coowners to contribute his proportion of the expenditures required thereby, the coowners who have performed the labor or made the improvements may, at the expiration of the year, give such delinquent coowners personal notice in writing, or notice by publication in the newspaper published nearest the claim, and in two newspapers published at Manila, one in the English language and the other in the Spanish language, to be designated by the Chief of the Philippine Insular Bureau of Public Lands, for at least once a week for ninety days; and if, at the expiration of ninety days after such notice in writing or by publication, such delinquent shall fail or refuse to contribute his proportion of the expenditure required by this section, his interest in the claim shall become the property of his coowners who have made the required expenditures. The period within which the work required to be done annually on all unpatented mineral claims shall commence on the first day of January succeeding the date of location of such claim.

Sec. 87. (*As amended by act of Congress approved February 6, 1905.*) That a patent for any land claimed and located for valuable mineral deposits may be obtained in the following manner: Any person, association, or corporation authorized to locate a claim under this Act, having claimed and located a piece of land for such purposes, who has or have complied with the terms of this Act, may file in the office of the provincial secretary, or such other officer as by the Government of said Islands may be described as mining recorder of the province wherein the land claimed is located, an application for a patent, under oath, showing such compliance, together with a plat and field notes of the claim or claims in common, made by or under the direction of the Chief of the Philippine Insular Bureau of Public Lands, showing accurately the boundaries of the claim, which shall be distinctly marked by monuments on the ground, and shall post a copy of such plat, together with a notice of such application for a patent, in a conspicuous place on the land embraced in such plat previous to the filing of the application for a patent, and shall file an affidavit of at least two persons that such notice has been duly posted, and shall file a copy of the notice in such office, and shall thereupon be entitled to a patent for the land, in the manner following: The provincial secretary, or such other officer as by the Philippine Government may be described as mining recorder, upon the filing of such application, plat, field notes, notices, and affidavits, shall publish a notice that such an application has been made, once a week for the period of sixty days, in a newspaper to be by him designated as nearest to such claim, and in two newspapers published at Manila, one in the English language and one in the Spanish

language, to be designated by the Chief of the Philippine Insular Bureau of Public Lands; and he shall also post such notice in his office for the same period. The claimant at the time of filing this application, or at any time thereafter within the sixty days of publication, shall file with the provincial secretary, or such other officer as by the Philippine Government may be described as mining recorder, a certificate of the Chief of the Philippine Insular Bureau of Public Lands that one thousand pesos' worth of labor has been expended or improvements made upon the claim by himself or grantors; that the plat is correct, with such further description by such reference to natural objects or permanent monuments as shall identify the claim, and furnish an accurate description to be incorporated in the patent. At the expiration of the sixty days of publication the claimant shall file his affidavit, showing that the plat and notice have been posted in a conspicuous place on the claim during such period of publication. If no adverse claim shall have been filed with the provincial secretary, or such other officer as by the Government of said Islands may be described as mining recorder, at the expiration of the sixty days of publication, it shall be assumed that the applicant is entitled to a patent upon the payment to the provincial treasurer, or the collector of internal revenue, of twenty-five pesos per hectare, and that no adverse claim exists; and thereafter no objection from third parties to the issuance of a patent shall be heard, except it be shown that the applicant has failed to comply with the terms of this Act: *Provided*, That where the claimant for a patent is not a resident of or within the province wherein the land containing the vein, ledge, or deposit sought to be patented is located, the application for patent and the affidavits required to be made in this section by the claimant for such patent may be made by his, her, or its authorized agent where said agent is conversant with the facts sought to be established by said affidavits.

SEC. 38. That applicants for mineral patents, if residing beyond the limits of the province or military department wherein the claim is situated, may make the oath or affidavit required for proof of citizenship before the clerk of any court of record, or before any notary public of any province of the Philippine Islands, or any other official in said Islands authorized by law to administer oaths.

SEC. 39. (*As amended by act of Congress approved February 6, 1905.*) That where an adverse claim is filed during the period of publication it shall be upon oath of the person or persons making the same, and shall show the nature, boundaries, and extent of such adverse claim, and all proceedings, except the publication of notice and making and filing of the affidavits thereof, shall be stayed until the controversy shall have been settled or decided by a court of competent jurisdiction or the adverse claim waived. It shall be the duty of the adverse claimant, within thirty days after filing his claim, to commence proceedings in a court of competent jurisdiction to determine the question of the right of possession and prosecute the same with reasonable diligence to final judgment, and a failure so to do shall be a waiver of his adverse claim. After such judgment shall have been rendered the party entitled to the possession of the claim, or any portion thereof, may, without giving further notice, file a certified copy of the judgment roll with the provincial secretary, or such other officer as by the Government of the Philippine Islands may be described as mining recorder, together with the certificate of the Chief of the Philippine Insular Bureau of Public Lands that the requisite amount of labor has been expended or improvements made thereon, and the description required in other cases, and shall pay to the provincial treasurer or the collector of internal revenue of the province in which the claim is situated, as the case may be, twenty-five pesos per hectare for his claim, together with the proper fees, whereupon the whole proceedings and the judgment roll shall be certified by the provincial secretary, or such other officer as by said Government may be described as mining recorder, to the Secretary of the Interior of the Philippine Islands, and a patent shall issue thereon for the claim, or such portion thereof as the applicant shall appear, from the decision of the court, rightly to possess. The adverse claim may be verified by the oath of any duly authorized agent or attorney in fact of the adverse claimant cognizant of the facts stated; and the adverse claimant, if residing or at the time being beyond the limits of the province wherein the claim is situated, may make oath to the adverse claim before the clerk of any court of record, or any notary public of any province or military department of the Philippine Islands, or any other officer authorized to administer oaths where the adverse claimant may then be. If it appears from the decision of the court that several parties are entitled to separate and

different portions of the claim, each party may pay for his portion of the claim, with the proper fees, and file the certificate and description by the Chief of the Philippine Insular Bureau of Public Lands, whereupon the provincial secretary or such other officer as by the Government of said Islands may be described as mining recorder shall certify the proceedings and judgment roll to the Secretary of the Interior for the Philippine Islands, as in the preceding case, and patents shall issue to the several parties according to their respective rights. If, in any action brought pursuant to this section, title to the ground in controversy shall not be established by either party, the court shall so find, and judgment shall be entered accordingly. In such case costs shall not be allowed to either party, and the claimant shall not proceed in the office of the provincial secretary or such other officer as by the Government of said Islands may be described as mining recorder or be entitled to a patent for the ground in controversy until he shall have perfected his title. Nothing herein contained shall be construed to prevent the alienation of a title conveyed by a patent or a mining claim to any person whatever.

SEC. 40. That the description of mineral claims upon surveyed lands shall designate the location of the claim with reference to the lines of the public surveys, but need not conform therewith; but where a patent shall be issued for claims upon unsurveyed lands, the Chief of the Philippine Insular Bureau of Public Lands in extending the surveys shall adjust the same to the boundaries of such patented claim according to the plat or description thereof, but so as in no case to interfere with or change the location of any such patented claim.

SEC. 41. That any person authorized to enter lands under this Act may enter and obtain patent to lands that are chiefly valuable for building stone under the provisions of this Act relative to placer mineral claims.

SEC. 42. That any person authorized to enter lands under this Act may enter and obtain patent to lands containing petroleum or other mineral oils and chiefly valuable therefor under the provisions of this Act relative to placer mineral claims.

SEC. 43. That no location of a placer claim shall exceed sixty-four hectares for any association of persons, irrespective of the number of persons composing such association, and no such location shall include more than eight hectares for an individual claimant. Such locations shall conform to the laws of the United States Philippine Commission, or its successors, with reference to public surveys, and nothing in this section contained shall defeat or impair any bona fide ownership of land for agricultural purposes or authorize the sale of the improvements of any bona fide settler to any purchaser.

SEC. 44. That where placer claims are located upon surveyed lands and conform to legal subdivisions, no further survey or plat shall be required, and all placer mining claims located after the date of passage of this Act shall conform as nearly as practicable to the Philippine system of public-land surveys and the regular subdivisions of such surveys; but where placer claims can not be conformed to legal subdivisions, survey, and plat shall be made as on unsurveyed lands; and where by the segregation of mineral lands in any legal subdivision a quantity of agricultural land less than sixteen hectares shall remain, such fractional portion of agricultural land may be entered by any party qualified by law for homestead purposes.

SEC. 45. That where such person or association, they and their grantors have held and worked their claims for a period equal to the time prescribed by the statute of limitations of the Philippine Islands, evidence of such possession and working of the claims for such period shall be sufficient to establish a right to a patent thereto under this Act, in the absence of any adverse claim; but nothing in this Act shall be deemed to impair any lien which may have attached in any way whatever prior to the issuance of a patent.

SEC. 46. That the Chief of the Philippine Insular Bureau of Public Lands may appoint competent deputy mineral surveyors to survey mining claims. The expenses of the survey of vein or lode claims and of the survey of placer claims, together with the cost of publication of notices, shall be paid by the applicants, and they shall be at liberty to obtain the same at the most reasonable rates, and they shall also be at liberty to employ any such deputy mineral surveyor to make the survey. The Chief of the Philippine Insular Bureau of Public Lands shall also have power to establish the maximum charges for surveys and publication of notices under this Act; and in case of excessive charges for publication he may designate any newspaper published in a province where mines are situated, or in Manila, for the publication of mining notices and fix the rates

to be charged by such paper; and to the end that the Chief of the Bureau of Public Lands may be fully informed on the subject such applicant shall file with the provincial secretary, or such other officer as by the Government of the Philippine Islands may be described as mining recorder, a sworn statement of all charges and fees paid by such applicant for publication and surveys, and of all fees and money paid the provincial treasurer or the collector of internal revenue, as the case may be, which statement shall be transmitted, with the other papers in the case, to the Secretary of the Interior for the Philippine Islands.

SEC. 47. That all affidavits required to be made under this Act may be verified before any officer authorized to administer oaths within the province or military department where the claims may be situated, and all testimony and proofs may be taken before any such officer, and, when duly certified by the officer taking the same, shall have the same force and effect as if taken before the proper provincial secretary or such other officer as by the Government of the Philippine Islands may be described as mining recorder. In cases of contest as to the mineral or agricultural character of land the testimony and proofs may be taken as herein provided on personal notice of at least ten days to the opposing party; or if such party can not be found, then by publication at least once a week for thirty days in a newspaper to be designated by the provincial secretary or such other officer as by said Government may be described as mining recorder published nearest to the location of such land and in two newspapers published in Manila, one in the English language and one in the Spanish language, to be designated by the Chief of the Philippine Insular Bureau of Public Lands; and the provincial secretary or such other officer as by said Government may be described as mining recorder shall require proofs that such notice has been given.

SEC. 48. That where nonmineral land not contiguous to the vein or lode is used or occupied by the proprietor of such vein or lode for mining or milling purposes, such nonadjacent surface ground may be embraced and included in an application for a patent for such vein or lode, and the same may be patented therewith, subject to the same preliminary requirements as to survey and notice as are applicable to veins or lodes; but no location of such nonadjacent land shall exceed two hectares, and payment for the same must be made at the same rate as fixed by this Act for the superficies of the lode. The owner of a quartz mill or reduction works not owning a mine in connection therewith may also receive a patent for his mill site as provided in this section.

SEC. 49. That as a condition of sale the Government of the Philippine Islands may provide rules for working, policing, and sanitation of mines, and rules concerning easements, drainage, water rights, right of way, right of Government survey and inspection, and other necessary means to their complete development not inconsistent with the provisions of this Act, and those conditions shall be fully expressed in the patent. The Philippine Commission or its successors are hereby further empowered to fix the bonds of deputy mineral surveyors.

SEC. 50. That whenever by priority of possession rights to the use of water for mining, agricultural, manufacturing, or other purposes have vested and accrued and the same are recognized and acknowledged by the local customs, laws, and the decisions of courts, the possessors and owners of such vested rights shall be maintained and protected in the same, and the right of way for the construction of ditches and canals for the purposes herein specified is acknowledged and confirmed, but whenever any person, in the construction of any ditch or canal, injures or damages the possession of any settler on the public domain, the party committing such injury or damage shall be liable to the party injured for such injury or damage.

SEC. 51. That all patents granted shall be subject to any vested and accrued water rights, or rights to ditches and reservoirs used in connection with such water rights as may have been acquired under or recognized by the preceding section.

SEC. 52. That the Government of the Philippine Islands is authorized to establish land districts and provide for the appointment of the necessary officers wherever they may deem the same necessary for the public convenience, and to further provide that in districts where land offices are established proceedings required by this Act to be had before provincial officers shall be had before the proper officers of such land offices.

SEC. 53. (*As amended by act of Congress approved February 6, 1905.*) That every person above the age of twenty-one years who is a citizen of the United

States or of the Philippine Islands, or who has acquired the right of a native of said Islands under and by virtue of the treaty of Paris, or any association of persons severally qualified as above, shall, upon application to the proper provincial treasurer, have the right to enter any quantity of vacant coal lands of said Islands, not otherwise appropriated or reserved by competent authority, not exceeding sixty-four hectares to such individual person, or one hundred and twenty-eight hectares to such association, upon payment to the provincial treasurer or the collector of internal revenue, as the case may be, of not less than fifty pesos per hectare for such lands, where the same shall be situated more than twenty-five kilometers from any completed railroad or available harbor or navigable stream, and not less than one hundred pesos per hectare of such land as shall be within twenty-five kilometers of such road, harbor, or stream: *Provided*, That such entries shall be taken in squares of sixteen or sixty-four hectares, in conformity with the rules and regulations governing the public-land surveys of the said Islands in plotting legal subdivisions.

SEC. 54. That any person or association of persons, severally qualified as above provided, who have opened and improved, or shall hereafter open and improve, any coal mine or mines upon the public lands, and shall be in actual possession of the same, shall be entitled to a preference right of entry under the preceding section of the mines so opened and improved.

SEC. 55. That all claims under the preceding section must be presented to the proper provincial secretary within sixty days after the date of actual possession and the commencement of improvements on the land by the filing of a declaratory statement therefor; and where the improvements shall have been made prior to the expiration of three months from the date of the passage of this Act, sixty days from the expiration of such three months shall be allowed for the filing of a declaratory statement; and no sale under the provisions of this Act shall be allowed until the expiration of six months from the date of the passage of this Act.

SEC. 56. That the three preceding sections shall be held to authorize only one entry by the same person or association of persons; and no association of persons, any member of which shall have taken the benefit of such sections, either as an individual or as a member of any other association shall enter or hold any other lands under the provisions thereof; and no member of any association which shall have taken the benefit of such section shall enter or hold any other lands under their provisions; and all persons claiming under section fifty-four shall be required to prove their respective rights and pay for the lands filed upon within one year from the time prescribed for filing their respective claims; and upon failure to file the proper notice or to pay for the land within the required period, the same shall be subject to entry by any other qualified applicant.

SEC. 57. That in case of conflicting claims upon coal lands where the improvements shall be commenced after the date of the passage of this Act, priority of possession and improvement, followed by proper filing and continued good faith, shall determine the preference right to purchase. And also where improvements have already been made prior to the passage of this Act, division of the land claimed may be made by legal subdivisions, which shall conform as nearly as practicable with the subdivisions of land provided for in this Act, to include as near as may be the valuable improvements of the respective parties. The Government of the Philippine Islands is authorized to issue all needful rules and regulations for carrying into effect the provisions of this and preceding sections relating to mineral lands.

SEC. 58. (*As amended by act of Congress approved February 6, 1905.*) That whenever it shall be made to appear to the secretary of any province or the commander of any military department in the Philippine Islands that any lands within the province are saline in character, it shall be the duty of said provincial secretary or commander, under the regulations of the Government of the Philippine Islands, to take testimony in reference to such lands, to ascertain their true character, and to report the same to the Secretary of the Interior for the Philippine Islands; and if upon such testimony the Secretary of the Interior shall find that such lands are saline and incapable of being purchased under any of the laws relative to the public domain, then and in such case said lands shall be offered for sale at the office of the provincial secretary or such other officer as by the said Government may be described as mining recorder of the province or department in which the same shall be situated, as the case may be, under such regulations as may be prescribed by said Govern-

ment, and sold to the highest bidder for cash at a price of not less than six pesos per hectare; and in case such lands fail to sell when so offered, then the same shall be subject to private sale at such office, for cash, at a price not less than six pesos per hectare, in the same manner as other lands in the said Islands are sold. All executive proclamations relating to the sales of public saline lands shall be published in only two newspapers, one printed in the English language and one in the Spanish language, at Manila, which shall be designated by said Secretary of the Interior.

SEC. 59. That no Act granting lands to provinces, districts, or municipalities to aid in the construction of roads, or for other public purposes, shall be so construed as to embrace mineral lands, which, in all cases, are reserved exclusively, unless otherwise specially provided in the act or acts making the grant.

SEC. 60. That nothing in this Act shall be construed to affect the rights of any person, partnership, or corporation having a valid, perfected mining concession granted prior to April eleventh, eighteen hundred and ninety-nine, but all such concessions shall be conducted under the provisions of the law in force at the time they were granted, subject at all times to cancellation by reason of illegality in the procedure by which they were obtained, or for failure to comply with the conditions prescribed as requisite to their retention in the laws under which they were granted: *Provided*, That the owner or owners of every such concession shall cause the corners made by its boundaries to be distinctly marked with permanent monuments within six months after this Act has been promulgated in the Philippine Islands, and that any concessions the boundaries of which are not so marked within this period shall be free and open to explorations and purchase under the provisions of this Act.

SEC. 61. That mining rights on public lands in the Philippine Islands shall, after the passage of this Act, be acquired only in accordance with its provisions.

SEC. 62. That all proceedings for the cancellation of perfected Spanish concessions shall be conducted in the courts of the Philippine Islands having jurisdiction of the subject-matter and of the parties, unless the United States Philippine Commission, or its successors, shall create special tribunals for the determination of such controversies.

AUTHORITY FOR THE PHILIPPINE ISLANDS GOVERNMENT TO PURCHASE LANDS OF RELIGIOUS ORDERS AND OTHERS AND ISSUE BONDS FOR PURCHASE PRICE.

SEC. 63. That the government of the Philippine Islands is hereby authorized, subject to the limitations and conditions prescribed in this Act, to acquire, receive, hold, maintain, and convey title to real and personal property, and may acquire real estate for public uses by the exercise of the right of eminent domain.

SEC. 64. That the powers hereinbefore conferred in section sixty-three may also be exercised in respect of any lands, easements, appurtenances, and hereditaments which, on the thirteenth of August, eighteen hundred and ninety-eight, were owned or held by associations, corporations, communities, religious orders, or private individuals in such large tracts or parcels and in such manner as in the opinion of the Commission injuriously to affect the peace and welfare of the people of the Philippine Islands. And for the purpose of providing funds to acquire the lands mentioned in this section said government of the Philippine Islands is hereby empowered to incur indebtedness, to borrow money, and to issue, and to sell at not less than par value, in gold coin of the United States of the present standard value or the equivalent in value in money of said Islands, upon such terms and conditions as it may deem best, registered or coupon bonds of said government for such amount as may be necessary, said bonds to be in denominations of fifty dollars or any multiple thereof, bearing interest at a rate not exceeding four and a half per centum per annum, payable quarterly, and to be payable at the pleasure of said government after dates named in said bonds not less than five nor more than thirty years from the date of their issue, together with interest thereon, in gold coin of the United States of the present standard value or the equivalent in value in money of said Islands; and said bonds shall be exempt from the payment of all taxes or duties of said government, or any local authority therein, or of the Government of the United States, as well as from taxation in any form by or under State, municipal, or local authority in the United States or the Philippine Islands. The moneys which may be realized or received from the issue and sale of said bonds shall be applied by the government of the Philippine Islands to the acquisition of the property authorized by this section, and to no other purposes.

SEC. 65. That all lands acquired by virtue of the preceding section shall constitute a part and portion of the public property of the government of the Philippine Islands, and may be held, sold, and conveyed, or leased temporarily for a period not exceeding three years after their acquisition by said government on such terms and conditions as it may prescribe, subject to the limitations and conditions provided for in this Act: *Provided*, That all deferred payments and the interest thereon shall be payable in the money prescribed for the payment of principal and interest of the bonds authorized to be issued in payment of said lands by the preceding section and said deferred payments shall bear interest at the rate borne by the bonds. All moneys realized or received from sales or other disposition of said lands or by reason thereof shall constitute a trust fund for the payment of principal and interest of said bonds, and also constitute a sinking fund for the payment of said bonds at their maturity. Actual settlers and occupants at the time said lands are acquired by the government shall have the preference over all others to lease, purchase, or acquire their holdings within such reasonable time as may be determined by said government.

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SEC. 75. That no corporation shall be authorized to conduct the business of buying and selling real estate or be permitted to hold or own real estate except such as may be reasonably necessary to enable it to carry out the purposes for which it is created, and every corporation authorized to engage in agriculture shall by its charter be restricted to the ownership and control of not to exceed one thousand and twenty-four hectares of land; and it shall be unlawful for any member of a corporation engaged in agriculture or mining and for any corporation organized for any purpose except irrigation to be in any wise interested in any other corporation engaged in agriculture or in mining. Corporations, however, may loan funds upon real estate security and purchase real estate when necessary for the collection of loans, but they shall dispose of real estate so obtained within five years after receiving the title. Corporations not organized in the Philippine Islands, and doing business therein, shall be bound by the provisions of this section so far as they are applicable. -

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ACTS OF THE PHILIPPINE COMMISSION.

The Public Land Act, No. 926, as amended by Acts Nos. 979, 1573, and 1699; and resolutions of the Philippine Commission extending the application of said act to territory theretofore excluded.

AN ACT Prescribing rules and regulations governing the homesteading, selling, and leasing of portions of the public domain of the Philippine Islands, prescribing terms and conditions to enable persons to perfect their titles to public lands in said Islands, providing for the issuance of patents without compensation to certain native settlers upon the public lands, providing for the establishment of town sites and sale of lots therein, and providing for a hearing and decision by the Court of Land Registration of all applications for the completion and confirmation of all imperfect and incomplete Spanish concessions and grants in said Islands, as authorized by sections thirteen, fourteen, and fifteen of the Act of Congress of July first, nineteen hundred and two, entitled "An act temporarily to provide for the administration of the affairs of civil government in the Philippine Islands, and for other purposes."

By authority of the United States, be it enacted by the Philippine Commission, that:

CHAPTER I.

HOMESTEADS ON THE PUBLIC DOMAIN.

SECTION 1. Any citizen of the Philippine Islands, or of the United States, or of any Insular possession thereof, over the age of twenty-one years or the head of a family, may, as hereinafter provided, enter a homestead of not exceeding sixteen hectares of unoccupied, unreserved, unappropriated agricultural public land in the Philippine Islands, as defined by the Act of Congress of July first, nineteen hundred and two, entitled "An Act temporarily to provide for the administration of the affairs of civil government in the Philippine Islands, and for other purposes," which shall be taken, if on surveyed lands, by legal subdivisions, but if on unsurveyed lands, shall be located in a body which shall be as nearly as practicable rectangular in shape and not more than eight hundred meters in length; but no person who is the owner of more than sixteen hectares of land in said Islands or who has had the benefits of any gratuitous allotment of sixteen hectares of land since the acquisition of the Islands by the United States, shall be entitled to the benefits of this chapter.

SEC. 2. Any person applying to enter land under the provisions of this chapter shall file with such officer as may be designated by law as local land officer, or in case there be no such officer then with the Chief of the Bureau of Public Lands, an application under oath showing that he has the qualifications required under section one of this chapter, and that he possesses none of the disqualifications there mentioned; that such application is made for his exclusive use and benefit; that the same is made for the purpose of actual settlement and cultivation, and not, either directly or indirectly, for the use or benefit of any other person, persons, corporation, or association of persons; that the land applied for is nonmineral, does not contain valuable deposits of coal or salts, is more valuable for agricultural than forestry purposes, and is not occupied by any other person; and showing the location of the land by stating the province, municipality, and barrio in which the same is situated, and as accurate a description as may be given, showing the boundaries of the land, having reference to natural objects and permanent monuments, if any. Upon the filing of said application the Chief of the Bureau of Public Lands shall summarily determine, by inquiry of the Chief of the the Bureau of Forestry and from the available land records, whether the land described is *prima facie* subject under the law to homestead settlement, and, if he shall find nothing to the contrary, the applicant, upon the payment of ten pesos, Philippine currency, shall be permitted to enter the quantity of land specified.

SEC. 3. No certificate shall be given or patent issued for the land applied for until the expiration of five years from the date of the filing of the application; and if, at the expiration of such time or at any time within three years thereafter.

the person filing such application shall prove by two credible witnesses that he has resided upon and cultivated the land for the term of five years immediately succeeding the time of filing the application aforesaid, and shall make affidavit that no part of said land has been alienated or encumbered, and that he has borne true allegiance to the Government of the United States and that of the Philippine Islands, then, upon payment of a fee of ten pesos, Philippine currency, to such officer as may be designated by law as local land officer, or in case there be no such officer then to the Chief of the Bureau of Public Lands, he shall be entitled to a patent: *Provided, however,* That in the event of the death of an applicant prior to the issuance of a patent, his widow shall be entitled to have a patent for the land applied for issue to her upon showing that she has consummated the requirements of law for homesteading the lands as above set out; and in case the applicant dies before the issuance of the patent and does not leave a widow, then the interest of the applicant in the land shall descend and patent shall issue to the persons who under the laws of the Philippine Islands would have taken had the title been perfected by patent before the death of the applicant, upon proof by the persons thus entitled of compliance with said requirements and conditions.

Sec. 4. No lands acquired under the provisions of this chapter shall in any event become liable to the satisfaction of any debt contracted prior to the issuance of a patent therefor.

Sec. 5. If, at any time after the filing of the application as hereinabove provided and before the expiration of the period allowed by law for the making of final proof, it is proved to the satisfaction of the Chief of the Bureau of Public Lands, after due notice to the homesteader, that the land entered is not under the law subject to homestead entry, or that the homesteader has actually changed his residence, voluntarily abandoned the land for more than six months at any one time during the five years of residence herein required, or has otherwise failed to comply with the requirements of law, then in that event the Chief of the Bureau of Public Lands may cancel the entry, subject to appeal under proper regulations to the Secretary of the Interior, and the land thereupon shall become subject to disposition as other public lands of like character.

Sec. 6. Not more than one homestead entry shall be allowed to any one person.

Sec. 7. Before final proof shall be submitted by any person claiming to have complied with the provisions of this chapter, due notice, as prescribed by the Chief of the Bureau of Public Lands with the approval of the Secretary of the Interior, shall be given to the public of his intention to make such proof, stating therein the time and place, and giving a description of the land and the names of the witnesses by whom it is expected that the necessary facts will be established.

Sec. 8. Any person may file an affidavit of contest against any homestead entry, charging that the land entered was not unoccupied, unreserved, or unappropriated agricultural land at the time of filing the application, alleging disqualification of the entryman, noncompliance with law as to residence or cultivation, or any other matter which, if proven, would be just cause for the cancellation of the entry, and upon successful termination of the contest, the contestant, if a qualified entryman, shall be allowed a preference right of entry for sixty days from said date.

The Chief of the Bureau of Public Lands or any public official becoming aware of the existence of any of the grounds above stated, for impeaching or canceling the entry, may file formal complaint against the entry on any such ground, which, if proven, shall cause the cancellation of the entry.

Sec. 9. No patent shall issue under the provisions of this chapter until the land has been surveyed under the direction of the Chief of the Bureau of Public Lands and an accurate plat made thereof, the cost of which survey shall be borne by the Insular Government.

CHAPTER II.

SALES OF PORTIONS OF THE PUBLIC DOMAIN.

Sec. 10. Any citizen of the Philippine Islands, or of the United States or of any insular possession thereof, or any corporation or like association of persons organized under the laws of the Philippine Islands or of the United States or any State, Territory, or insular possession thereof, and authorized to transact business in the Philippine Islands, may purchase any tract of unoccupied,

unappropriated, and unreserved nonmineral agricultural public land in the Philippine Islands, as defined in the Act of Congress of July first, nineteen hundred and two, not to exceed sixteen hectares for an individual or one thousand and twenty-four hectares for a corporation or like association, by proceeding as hereinafter provided in this chapter: *Provided*, That no association of persons not organized as above and no mere partnership shall be entitled to purchase a greater quantity than will equal sixteen hectares for each member thereof.

Sec. 11. Purchases, made under the provisions of this chapter of land previously surveyed, must be made of contiguous legal subdivisions. All lands purchased hereunder, whether previously surveyed or not, in case the tract sought to be purchased exceeds sixty-four hectares in area, must be taken, wherever possible, in the form of contiguous squares which shall contain at least sixty-four hectares each: *Provided*, That in connection with the purchase of lands in one or more tracts of sixty-four hectares there may be purchased one rectangular tract of thirty-two hectares, the longer side of which must be contiguous to the square tract of sixty-four hectares, or to one of such tracts if more than one be purchased. In no case may lands purchased under the provisions of this chapter be taken in such manner as to gain any such control of any adjacent land, water, stream, shore line, way, roadstead, or other valuable right as might be prejudicial to the interests of the public.

Sec. 12. An application to purchase land under this chapter must be filed with such officer as may be designated by law as local land officer, or in case there be no such officer then with the Chief of the Bureau of Public Lands. It must be executed under oath and must state the citizenship of the applicant and his post-office address; the location of the land desired, stating the province, municipality, and barrio in which the same is situated, and as accurate a description as can be given, showing the boundaries of the land, having reference to natural objects and permanent monuments, if any; a statement as to whether any part of the land is occupied or improved, and that it is nonmineral in character, more valuable for agricultural than for forestry purposes, and does not contain deposits of coal or salts. The application of a corporation must be accompanied by a certified copy of its charter or articles of incorporation. An unincorporated association must show that its members are severally possessed of the qualifications above required of individuals. In the case of a corporation or association organized outside of the Philippine Islands there must be attached to the application proper documentary evidence that the law governing the transaction of business in the Philippine Islands by foreign corporations or associations has been complied with.

Sec. 13. It shall be the duty of the Chief of the Bureau of Public Lands to examine all applications to purchase under this chapter, and to determine whether the applicant has the qualifications required in section ten thereof, and from the certificate of the Chief of the Bureau of Forestry to determine whether the land applied for is more valuable for agricultural than forestry purposes. He shall report his findings to the Secretary of the Interior, who, after proper consideration and approval of same, shall order the sale to be made.

It shall also be the duty of the Chief of the Bureau of Public Lands to appraise the land applied for under this chapter, which appraisement shall not be less than ten pesos, Philippine currency, per hectare, and in making this appraisal he may call to his assistance any provincial or municipal official of the province in which the land lies. When the land shall have been appraised, as hereinabove provided, the Chief of the Bureau of Public Lands shall advertise the same for sale by publishing a notice thereof once a week for six consecutive weeks, in two newspapers, one published at Manila and the other (if any such there be) published near the land applied for, such notices to be published in both the English and Spanish languages. The Chief of the Bureau of Public Lands shall, with the approval of the Secretary of the Interior, prescribe, in addition to the publication in newspapers, a suitable method of posting notice upon the land sought to be purchased or in the pueblo where the land is situated. The notices shall state a date not earlier than ten days after the date of the last publication of the notice in the newspaper published at Manila, upon which date the Chief of the Bureau of Public Lands will award the land to the highest bidder, or will call for new bids, or otherwise proceed as provided by law.

Sec. 14. All bids must be sealed and addressed to the Chief of the Bureau of Public Lands, and must have inclosed therewith a certified check or a post-office money order payable to his order, for twenty-five per centum of the amount of the bid, which amount shall be retained, in case the bid is accepted,

as part payment of the purchase price: *Provided*, That no bids shall be considered which are for less than the appraised value of the land.

SEC. 15. Upon the opening of the bids the land shall be awarded to the highest bidder. If there are two or more bidders which are higher than other bidders and are equal, and one of such higher and equal bids is the bid of the applicant, his bid shall be accepted. If, however, the bid of the applicant is not one of such equal and higher bids, then the Chief of the Bureau of Public Lands shall at once submit the lands for public bidding, and to the person making the highest bid on such public auction the land shall be awarded, but no bid received at such public auction shall be finally accepted until the bidder shall have deposited twenty-five per centum of his bid, as required in section fourteen. The deposits of all unsuccessful bidders shall be returned at once by the Chief of the Bureau of Public Lands. The Chief of the Bureau of Public Lands, with the approval of the Secretary of the Interior, shall have authority to reject any and all bids hereunder.

SEC. 16. Land sold under the provisions of this chapter must be paid for in the following manner: The balance of the purchase price after deducting the amount paid by check or post-office money order at the time of submitting the bid, may be paid in full upon the making of the award, or may be paid in equal annual installments, or may be paid in one installment at the expiration of five years from the date of the award. All sums remaining unpaid after date of the award shall bear six per centum interest per annum from such date until paid.

SEC. 17. No patent shall issue under the provisions of this chapter until the land has been surveyed under the direction of the Chief of the Bureau of Public Lands and an accurate plat made thereof. The cost of such survey must be borne by the purchaser, if a corporation or like association, and if the survey be made in advance of the regular surveys of the Islands; but where the purchaser is an individual the cost of the survey shall be borne by the Insular Government. Patents shall not issue until after the expiration of five years from the date of the award, and before the same shall issue the purchaser must show actual occupancy, cultivation, and improvement of the premises for a period of five years immediately succeeding the date of the award, and that he has not sold the land or in any manner encumbered the title.

SEC. 18. If at any time after the date of the award and before the issuance of patent, it is proven to the satisfaction of the Chief of the Bureau of Public Lands, after due notice to the purchaser, that the purchaser has voluntarily abandoned the land for more than one year at any one time, or has otherwise failed to comply with the requirements of the law, then the land shall revert to the Government and all prior payments of purchase money shall be forfeited.

SEC. 19. This chapter shall be held to authorize only one purchase of the maximum amount of land hereunder by the same person, or by the same corporation or association of persons; and no corporation or association, any member of which shall have taken the benefits of this chapter, either as an individual or as a member of any other corporation or association, shall purchase any other public lands under this chapter.

SEC. 20. In the event of the death of an individual applicant subsequent to the date of the filing of the application and prior to the issuance of patent, the distributees of his estate, as defined by law, may claim the privilege of being subrogated to the rights of the deceased applicant, and if they consummate the requirements of law for purchasing land hereunder, patent shall issue to such distributees.

SEC. 21. If any land applied for under the provisions of this chapter shall be actually occupied by any person who is qualified to make a homestead or other entry under the public-land laws of the Philippine Islands, or by any native who is entitled by law to a free patent, such person shall be personally served with notice as to his rights, and shall be allowed a preference right of one hundred and twenty days within which to make entry or apply for patent.

CHAPTER III.

LEASES OF PORTIONS OF THE PUBLIC DOMAIN.

SEC. 22. Any citizen of the United States, or of the Philippine Islands, or of any insular possession of the United States, or any corporation or association of persons organized under the laws of the Philippine Islands or of the United States or of any State, Territory, or insular possession thereof, authorized by

the laws of its creation and by the laws of the Philippine Islands and the Acts of Congress applicable thereto to transact business in the Philippine Islands, may lease any tract of unoccupied, unreserved, nonmineral agricultural public lands, as defined by sections eighteen and twenty of the Act of Congress approved July first, nineteen hundred and two, providing a temporary government for the Philippine Islands, and so forth, not exceeding one thousand and twenty-four hectares, by proceeding as hereinafter in this chapter indicated: *Provided*, That no lease shall be permitted to interfere with any prior claim by settlement or occupation until the consent of the occupant or settler is first had and obtained, or until such claim shall be legally extinguished: *And provided further*, That no corporation or association of persons shall be permitted to lease lands hereunder which are not reasonably necessary to enable it to carry on the business for which it was lawfully created and which it may lawfully pursue in the Philippine Islands.

SEC. 23. Leases made under the provisions of this chapter, of land previously surveyed, must be made of contiguous legal subdivisions. All lands leased hereunder, whether previously surveyed or not, in case the tract sought to be leased exceeds sixty-four hectares in area, must be taken, where possible, in the form of contiguous squares which shall contain at least sixty-four hectares each: *Provided*, That in connection with the lease of lands in one or more tracts of sixty-four hectares there may be leased one rectangular tract of thirty-two hectares, the longer side of which must be contiguous to the square tract of sixty-four hectares, or to one of such tracts if more than one be leased. In no case may lands leased under the provisions of this chapter be taken so as to gain a control of adjacent land, water, stream, shore line, way, roadstead, or other valuable right which in the opinion of the Chief of the Bureau of Public Lands would be prejudicial to the interests of the public.

SEC. 24. An application to lease land under this chapter must be executed under oath and filed with such officer as may be designated by law as local land officer of the district in which the land is situated, or in case there be no such officer then with the Chief of the Bureau of Public Lands, and must show the following facts: The citizenship and post-office address of the applicant; the location of the land, showing the province, municipality, and barrio in which the same is situated, and as accurate a description as may be given, showing the boundaries of the land, having reference to natural objects and permanent monuments, if any; a statement as to whether the land contains any improvements or evidences of settlement and cultivation, and a statement that it is nonmineral in character, more valuable for agricultural than for forestry purposes, and does not contain deposits of coal or salts. Corporations and associations shall be required to file evidence of their legal existence and authority to transact business in the Philippine Islands.

SEC. 25. All applicants for leases under the terms of this chapter must give notice, by publication and by such other means as may be required by the Chief of the Bureau of Public Lands, with the approval of the Secretary of the Interior, of intent to make application to lease the tract in question, which notice shall state the date when the application will be presented and shall describe as definitely as practicable the land sought to be leased.

SEC. 26. It shall be the duty of the Chief of the Bureau of Public Lands to examine all applications for leases under this chapter, and to determine whether the applicant has the qualifications required in section twenty-two hereof, and, from the certificate of the Chief of the Bureau of Forestry, to determine whether the land applied for is more valuable for agricultural than forestry purposes, and further summarily to determine from available records whether the land is nonmineral and does not contain deposits of coal or salts. He shall report his findings to the Secretary of the Interior, who, after proper consideration and approval of same, shall cause the lease to be executed.

SEC. 27. The rate per hectare per annum for lands leased under this chapter shall be fixed by the Chief of the Bureau of Public Lands, with the approval of the Secretary of the Interior, and shall in no case be less than fifty centavos, Philippine currency, per hectare per annum; said rent shall be paid yearly in advance, the first payment being deposited with the Chief of the Bureau of Public Lands before the delivery of the lease.

SEC. 28. Leases hereunder shall run for a period of not more than twenty-five years, but may be renewed for a second period of twenty-five years, at a rate to be fixed as above indicated, which rate shall not be less than fifty centavos per hectare and shall not exceed one peso and fifty centavos, Philippine cur-

rency, per hectare. Land leased hereunder shall not be assigned or sublet without the consent of the Chief of the Bureau of Public Lands and the Secretary of the Interior.

SEC. 29. No land shall be leased under the provisions of this chapter until the land has been surveyed under the direction of the Chief of the Bureau of Public Lands and an accurate plat made thereof, the cost of survey to be borne by the lessee.

SEC. 30. The lease of any lands under this chapter shall not confer the right to remove or dispose of any valuable timber except as provided in regulations of the Bureau of Forestry for cutting timber upon such lands. Nor shall such lease confer the right to remove or dispose of stone, oil, coal, salts, or other minerals, but the lease as to the part thereof which shall be mineral may be canceled by the Chief of the Bureau of Public Lands, with the approval of the Secretary of the Interior, whenever the mineral character of such part shall be made satisfactorily to appear, after due notice to the lessee.

SEC. 31. The commission of waste or the violation of the forestry regulations by the lessee shall work a forfeiture of his last payment of rent and render him liable to immediate dispossession and suit for damage.

CHAPTER IV.

FREE PATENTS TO NATIVE SETTLERS.

SEC. 32. Any native of the Philippine Islands now an occupant and cultivator of unreserved, unappropriated agricultural public land, as defined by the Act of Congress of July first, nineteen hundred and two, who has continuously occupied and cultivated such land, either by himself or through his ancestors, since August first, eighteen hundred and ninety-eight; or who, prior to August first, eighteen hundred and ninety-eight, continuously occupied and cultivated such land for three years immediately prior to said date, and who has been continuously since July fourth, nineteen hundred and two, until the date of the taking effect of this Act, an occupier and cultivator of such land, shall be entitled to have a patent issued to him without compensation for such tract of land, not exceeding sixteen hectares, as hereinafter in this chapter provided.

SEC. 33. Any person desiring to obtain the benefits of this chapter must, prior to January first, nineteen hundred and seven,^a file an application for a patent with such officer as may be designated by law as local land officer, or in case there be no such officer then with the Chief of the Bureau of Public Lands. Said application must be executed under oath, and must show the following facts: The name, age, and post-office address of the applicant; that he is a native of the Philippine Islands; the location of the land desired, stating the province, municipality, and barrio in which the same is situated, and as accurate a description as may be given, showing the boundaries of the land, having reference to natural objects and permanent monuments, if any; that the land is not claimed or occupied by any other person; a statement as to the date when the applicant or his ancestor, giving the name of ancestor and stating his relationship to the applicant, entered into occupation and began cultivation, and a description of the improvements which have been made. If the first occupation and cultivation is claimed through an ancestor, the applicant must show the name of such ancestor and file satisfactory evidence of the date and place of his death and burial, in which case the patent shall issue in the name of the heir or heirs of such ancestor as defined by the laws of the Philippine Islands.

SEC. 34. Upon receipt of said application it shall be the duty of the Chief of the Bureau of Public Lands to cause a careful investigation to be made in such manner as he shall deem necessary for the ascertainment of the truth of the allegations therein contained, and if satisfied upon such investigation that the applicant comes within the provisions of this chapter, he shall cause a patent to issue for the tract to such applicant, or to the heirs of his ancestor, as provided in the next preceding section, not exceeding sixteen hectares in extent: *Provided*, That no application shall be finally acted upon until notice thereof has been published in the municipality and barrio in which the land is located, and

^aAct No. 1573 of the Philippine Commission, enacted December 12, 1906, extends from January 1, 1907, to January 1, 1909, the time within which native settlers may file applications for free patents. Wherever the date January 1, 1907, appears herein, same should now read January 1, 1909. See page 478.

adverse claimants have had opportunity to present their claims: *And provided further*, That no patent shall issue until the land has been surveyed under direction of the Chief of the Bureau of Public Lands and an accurate plat made thereof.

SEC. 35. Lands acquired under the provisions of this chapter shall be inalienable and shall not be subject to incumbrance for a period of seven years from the date of the issuance of the patent therefor, and shall not be liable for the satisfaction of any debt contracted prior to the expiration of that period.

CHAPTER V.

TOWN SITES.

SEC. 36. Whenever in the opinion of the Secretary of the Interior it shall be in the public interest to reserve a town site from the public land or to acquire lands for such purpose by the exercise of the right of eminent domain, he shall direct the Chief of the Bureau of Public Lands to have made a survey of the exterior boundaries of the land which he deems it wise so to reserve or acquire.

SEC. 37. Upon the completion and return of the survey mentioned in section thirty-six, the Secretary of the Interior shall forward the same to the Philippine Commission with his recommendations.

SEC. 38. The Commission, if it approves the recommendations of the Secretary of the Interior, shall pass a resolution reserving the land surveyed, or such part thereof as it may deem wise, as a town site, and a certified copy of such resolution shall be sent to the Chief of the Bureau of Public Lands who shall record the same in the records of his office and forward a certified copy of such record to the registrar of the province in which the surveyed land lies.

SEC. 39. It shall then be the duty of the Chief of the Bureau of Public Lands, having recorded the resolution of the Commission and the preliminary survey accompanying the same, to direct a subdivision and plat of the land, in accordance with the directions contained in the resolution approving the same, if such resolution contain directions as to the method of subdivision, or, if it contain no such direction, then in a manner which shall to the Chief of the Bureau of Public Lands seem best adapted to the convenience and interest of the public and the residents of the future town.

SEC. 40. The Commission, by resolution, or in the absence of action in this regard by the Commission, the Chief of the Bureau of Public Lands, shall reserve from the land to be plotted, lots of sufficient size and convenient situation for public uses, as well as the necessary avenues, streets, alleys, parks, and plazas.

SEC. 41. The plat of the subdivision shall designate certain lots as business lots and the remainder as residence lots, and shall also reserve and note the lots of land owned by private individuals as evidenced by record titles, or as possessed and claimed by them as private property: *Provided, however*, That the avenues, streets, alleys, parks, plazas, and lots shall be laid out on the plat as though the lands owned or claimed by private persons were part of the public domain and part of the reservation, with a view to the possible subsequent purchase or condemnation thereof, if deemed necessary by the proper authorities.

SEC. 42. All lots, whether public or private, contained in the exterior boundaries shall be plotted and numbered upon a general plan or system.

SEC. 43. The plat of the subdivision of the reserved town site thus prepared under the supervision of the Chief of the Bureau of Public Lands shall be submitted to the Secretary of the Interior for presentation to the Commission for its consideration, modification, amendment, or approval.

SEC. 44. The resolution of the Commission approving the plat shall provide whether the proceeds derived from the sale of lots shall be covered into the Insular Treasury as general Insular funds, or as a special fund to be devoted to public improvements in or near the town site, and thereafter the receipts from the sale of lots shall be applied as provided in the resolution of the Commission:

SEC. 45. Where the proceeds of the sale are to constitute a fund to be devoted to public improvements in or near the town site, the same shall be expended as provided by law or resolution of the Commission.

SEC. 46. When the plat of subdivision is approved by the Commission it shall be certified to the Chief of the Bureau of Public Lands, together with the

resolution approving the same, and the Chief of the Bureau of Public Lands shall record the same in the records of his office and shall forward a certified copy of such record to the registrar of the province in which the land lies, to be by such registrar recorded in the records of his office.

SEC. 47. All lots except those claimed by or belonging to private owners and claimants and excepting such lots and tracts as may be reserved for parks, public buildings, and other public uses, shall be sold under the direction of the Chief of the Bureau of Public Lands, as hereinafter in this chapter provided, and the Chief of the Bureau of Public Lands, with the approval of the Secretary of the Interior, shall prescribe rules and regulations for the disposal of lots hereunder.

SEC. 48. All lots in the reservation which are subject to sale as above provided, shall, if in the opinion of the Secretary of the Interior the value of the lots is sufficiently known to make an appraisement useful, be appraised by a committee to be appointed by the Chief of the Bureau of Public Lands with the approval of the Secretary of the Interior.

SEC. 49. The lots in any such town site thus established and subject to sale, shall, after the approval and recording of the plat of subdivision as above provided, and after due advertisement, be sold at public auction to the highest bidder; but no bid shall be accepted, in case of appraised lots, if the bid does not equal two-thirds of the appraised value, and in the case of lots not appraised the bid shall not be accepted if in the judgment of the Chief of the Bureau of Public Lands and the Secretary of the Interior the bid is an inadequate price for the lot.

SEC. 50. Not more than two residence lots and two business lots in any one town site shall be sold to any one person, corporation, or association without the specific approval of the Secretary of the Interior.

SEC. 51. Lots which have been offered for sale in the manner herein prescribed, and for which no satisfactory bid has been received, shall be again offered for sale after due advertisement, and if at the second sale no satisfactory bid is received, they may be sold at private sale by the Chief of the Bureau of Public Lands for not less than their value, as appraised by a committee to be appointed by the Chief of the Bureau of Public Lands with the approval of the Secretary of the Interior.

SEC. 52. In any case in which, in the opinion of the Commission, it shall be necessary to condemn private lands within the reserved or proposed limits of a town site, either for streets, alleys, parks, or as lots for public buildings or other public uses, the Commission shall pass a resolution declaring the necessity for the same, which resolution shall be certified to the Attorney-General, who shall at once begin proceedings for the condemnation of the lands described in the resolution, in accordance with the provisions of the Code of Civil Procedure.

SEC. 53. Town sites constituted under the provisions of this chapter on land forming a part of an existing municipality shall remain within the jurisdiction of such municipality until taken therefrom by legislative action of the Commission.

CHAPTER VI.

UNPERFECTED TITLES AND SPANISH GRANTS AND CONCESSIONS.

SEC. 54. The following-described persons or their legal successors in right, occupying public lands in the Philippine Islands, or claiming to own any such lands or an interest therein, but whose titles to such lands have not been perfected, may apply to the Court of Land Registration of the Philippine Islands for confirmation of their claims and the issuance of a certificate of title therefor, to wit:

1. All persons who prior to the transfer of sovereignty from Spain to the United States had fulfilled all the conditions required by the Spanish laws and royal decrees of the Kingdom of Spain for the purchase of public lands, including the payment of the purchase price, but who failed to secure formal conveyance of title;

2. All persons who prior to the transfer of sovereignty from Spain to the United States, having applied for the purchase of public lands and having secured a survey, auction, and an award, or a right to an award, of such lands, did not receive title therefor through no fault upon their part;

3. All persons who prior to the transfer of sovereignty from Spain to the United States, having applied for the purchase of public lands and having

secured a survey and award of same, did not, through negligence upon their part, comply with the conditions of full or any payment therefor, but who after such survey and award shall have occupied the land adversely, except as prevented by war or *force majeure*, until the taking effect of this Act;

4. All persons who were entitled to apply and did apply for adjustment or composition of title to lands against the Government under the Spanish laws and royal decrees in force prior to the royal decree of February thirteenth, eighteen hundred and ninety-four, but who failed to receive title therefor through no default upon their part;

5. All persons who were entitled to a gratuitous title to public lands by "possessory proceedings" under the provisions of articles nineteen and twenty of the royal decree of the King of Spain issued February thirteenth, eighteen hundred and ninety-four, and who, having complied with all the conditions therein required, failed to receive title therefor through no default upon their part; and

6. All persons who by themselves or their predecessors in interest have been in the open, continuous, exclusive, and notorious possession and occupation of agricultural public lands, as defined by said Act of Congress of July first, nineteen hundred and two, under a bona fide claim of ownership except as against the Government, for a period of ten years next preceding the taking effect of this Act, except when prevented by war or *force majeure*, shall be conclusively presumed to have performed all the conditions essential to a Government grant and to have received the same, and shall be entitled to a certificate of title to such land under the provisions of this chapter.

All applicants for lands under paragraphs one, two, three, four, and five of this section must establish by proper official records or documents that such proceedings as are therein required were taken and the necessary conditions complied with: *Provided, however*, That such requirements shall not apply to the fact of adverse possession.

Sec. 55. All persons claiming title to Government lands not coming within the classes specified in the preceding section are excluded from the benefits of this chapter.

Sec. 56. Any person or persons, or their legal representatives or successors in right, claiming any lands or interest in lands in the Philippine Islands, under the provisions of this chapter, and who now desire or claim the right to have such title perfected, must in every case present an application in writing to the Court of Land Registration praying that the validity of the alleged title or claim be inquired into and that a certificate of title issue to them under the provisions of the Land Registration Act for the lands claimed.

Sec. 57. Such claims and applications shall conform as nearly as may be in their material allegations to the requirements of an application for registration under the provisions of section twenty-one and subsequent sections of the Land Registration Act, and shall be accompanied by a plan of the land and all documents evidencing a right on the part of the applicant to the lands claimed. The application shall also set forth fully the nature of the claim to the land, and when based upon proceedings initiated under Spanish laws shall particularly state the date and form of the grant, concession, warrant, or order of survey under which the claim is made; by whom such grant, concession, warrant, or order of survey was made; the extent of the compliance with the conditions required by the Spanish laws and royal decrees for the acquisition of legal title, and if not fully complied with the reason for such noncompliance, together with a statement of the length of time such land or any portion thereof has been actually occupied by the claimant and his predecessors in interest; the use made of the land, and the nature of the inclosure, if any. The fees provided to be paid for the registration of lands under the Land Registration Act shall be collected from applicants under this chapter, except that upon the original registration of land claimed hereunder no fee shall be required for the assurance fund.

Sec. 58. Any applicant for registration of lands under the provisions of this chapter may, upon petition directed to the Chief of the Bureau of Public Lands, and upon payment of the fees as regulated by law, secure a survey and plan of the lands claimed to be owned by him, which said plan shall be filed with his application in the Court of Land Registration.

Sec. 59. (*As amended by Act No. 1699.*) Upon the filing of claims and applications for registration in the Court of Land Registration, under this chapter, the same procedure shall be adopted in the hearing of such cases and in the matter of appeal as is by the Land Registration Act provided for other claims,

except that a notice of all such applications, together with a plan of the lands claimed, shall be immediately forwarded to the Director of Lands, who shall be represented in all questions arising upon the consideration of such applications by the Attorney-General or by any subordinate or assistant to the Attorney-General appointed for that purpose: *Provided*, That prior to the publication for hearing, all of the papers in such case shall be transmitted by the clerk to the Attorney-General in order that he may, if he considers it advisable for the interests of the Government, investigate all of the facts alleged in the application or otherwise brought to his attention. The Attorney-General shall return such papers to the clerk as soon as practicable within three months.

SEC. 60. It shall be the duty of the examiner of titles, upon reference to him of any such claim or application, to investigate all the facts alleged therein or otherwise brought to his attention, and to make careful inquiry as to the period of occupation of the land by the claimant or his predecessors in interest; the nature of such lands; the character of the inclosure, if any, and the extent to which the land has been subjected to cultivation. He shall file a full report of his investigation in the case, concluding with a certificate of his opinion upon the merits of the claim.

SEC. 61. It shall be lawful for the Chief of the Bureau of Public Lands, whenever in the opinion of the Chief Executive the public interest shall require it, to cause to be filed in the Court of Land Registration, through the Attorney-General, a petition against the holder, claimant, possessor, or occupant of any land in the Philippine Islands who shall not have voluntarily come in under the provisions of this chapter or the Land Registration Act, stating in substance that the title of such holder, claimant, possessor, or occupant is open to question, or stating in substance that the boundaries of any such land which has not been brought into court as aforesaid are open to question, and praying that the title to any such land or the boundaries thereof or the right to occupancy thereof be settled and adjudicated. Such petition shall contain all the data essential to furnish a full notice thereof to the occupant of such land and to all persons who may claim an adverse interest therein, and shall be accompanied by a plan of the land in question. The court shall cause service of notice to be made as in other cases, and shall proceed to hear, try, and determine the questions stated in such petition or arising in the matter, and settle and determine the ownership of the land and cause certificate of title to be issued therefor, as in other cases filed under this chapter.

SEC. 62. Whenever any lands in the Philippine Islands are set apart as town sites, under the provisions of Chapter Five of this Act, it shall be lawful for the Chief of the Bureau of Public Lands, with the approval of the Secretary of the Interior, to notify the judge of the Court of Land Registration that such lands have been reserved as a town site and that all private lands or interests therein within the limits described ought forthwith to be brought within the operation of the Land Registration Act, and to become registered land within the meaning of said Registration Act. It shall be the duty of the judge of said court to issue a notice thereof, stating that claims for all private lands or interests therein within the limits described must be presented for registration under the Land Registration Act in the manner provided in Act Numbered Six hundred and twenty-seven, entitled "An Act to bring immediately under the operation of the Land Registration Act all lands lying within the boundaries lawfully set apart for military reservations, and all lands desired to be purchased by the Government of the United States for military purposes." The procedure for the purpose of this section and the legal effects thereof shall thereupon be in all respects as provided in sections three, four, five, and six of said Act Numbered Six hundred and twenty-seven.

SEC. 63. All proceedings under this chapter involving title to or interest in land shall be conducted and considered as an application for registration of such land, and the final decree of the court shall in every case be the basis for the original certificate of title in favor of the person entitled to the property under the procedure prescribed in section forty-one of the Land Registration Act.

SEC. 64. If in the hearing of any application arising under this chapter the court shall find that more than one person or claimant has an interest in the land, such conflicting interests shall be adjudicated by the court and decree awarded in favor of the person or persons entitled to the land, according to the laws of the Philippine Islands, except that where the action is voluntarily dismissed by the parties interested the order of the court shall be merely one of dismissal without affecting title.

SEC. 65. Whenever, in any proceedings under this chapter to secure registration of an incomplete or imperfect claim of title initiated prior to the transfer of sovereignty from Spain to the United States, it shall appear that had such claims been prosecuted to completion under the laws prevailing when instituted, and under the conditions of the grant then contemplated, the conveyance of such land to the applicant would not have been gratuitous but would have involved payment thereof to the Government, then and in that event the court shall, after decreeing in whom title should vest, further determine the amount to be paid as a condition for the registration of the land. Such judgment shall be certified to the Bureau of Public Lands by the clerk of the court for collection of the amount due from the person entitled to conveyance. Upon payment to the Chief of the Bureau of Public Lands of the price specified in the judgment, the case shall be returned by him to the Court of Land Registration with a notation of such payment, whereupon the registration of the land in favor of the party entitled thereto shall be ordered by the court. If the applicant shall fail to pay the amount of money required by the decree within a reasonable time after he receives notice thereof the court may order the proceeding to stand dismissed and the title to the land shall then be in the Government free from any claim of the applicant.

SEC. 66. Whenever any judgment of confirmation or other decree of the court involving public lands shall become final, the clerk of the court shall certify that fact to the Bureau of Public Lands, with a copy of the decree of confirmation or judgment of the court, which shall plainly state the location, boundaries, and area as nearly as may be, of the tract involved in the decree or judgment, and shall be accompanied by a plan of the land as confirmed or acted upon by the court. In the event the original survey was made by the Bureau of Public Lands and the decree of the court conforms thereto, no further proceedings shall be required. When the original survey was made by the applicant or where the tract confirmed by the court varies from the original survey as made by the Bureau of Public Lands, the Chief of the Bureau of Public Lands shall immediately cause the tract, so confirmed by the court, to be surveyed at the cost of the Insular Government, and shall, when such survey has been approved by him, furnish a copy of same to the Court of Land Registration and to the applicant, which survey when approved by the court, and unless objected to by the applicant within thirty days, shall be conclusively presumed to be correct. If objection is made to the survey by the applicant, the court, upon notice to the Bureau of Public Lands, shall hear such objections, and its action in the matter shall be final.

SEC. 67. No title to, or right or equity in, any public lands in the Philippine Islands may hereafter be acquired by prescription or by adverse possession or occupancy, or under or by virtue of any laws in effect prior to American occupation, except as expressly provided by laws enacted or provided since the acquisition of the Islands by the United States.

CHAPTER VII.

GENERAL PROVISIONS.

SEC. 68. The short title of this Act shall be "The Public Land Act."

SEC. 69. The Chief of the Bureau of Public Lands, under the supervision of the Secretary of the Interior, shall prepare and issue such forms and instructions, consistent with this Act, as may be necessary and proper to carry into effect all the provisions thereof that are to be administered by or under the direction of the Bureau of Public Lands, and for the conduct of all proceedings arising under such provisions.

SEC. 70. While title to public lands in the Philippine Islands remains in the Government, the Chief of the Bureau of Public Lands, under the supervision of the Secretary of the Interior, shall be charged with the immediate executive control of the survey, classification, lease, sale, and other disposition and management thereof, and the decisions of the Bureau as to questions of facts relating to such lands shall be conclusive when approved by the Secretary of the Interior.

SEC. 71. The Civil Governor, for reasons of public policy, may, from time to time, by proclamation, designate any tract or tracts of public lands in the Philippine Islands as nonalienable, and thereafter the same shall be withdrawn from settlement, entry, sale, or other disposition under any of the public-land laws of the Islands until again made subject thereto by law of the Islands.

SEC. 72. Provincial secretaries and all other persons that may be designated as mining recorders shall, in their capacities as such recorders, be subject to the supervision of the Chief of the Bureau of Public Lands.

SEC. 73. All patents or certificates for lands disposed of under this law shall be prepared in the Bureau of Public Lands and shall issue in the name of the United States and the Philippine Government under the signature of the Civil Governor; but such patents or certificates shall be effective only for the purposes defined in section one hundred and twenty-two of the Land Registration Act, and the actual conveyance of the land shall be effected only as provided in said section.

SEC. 74. All persons receiving title to Government lands under the provisions of this Act, shall hold such lands subject to the same public servitudes as existed upon lands owned by private persons under the sovereignty of Spain, including those with reference to the littoral of the sea and the banks of navigable rivers or rivers upon which rafting may be done.

SEC. 75. The beneficial use of water shall be the basis, the measure, and the limit of all rights thereto in said Islands, and the patents herein granted shall be subject to the right of the Government of these Islands to make such rules and regulations for the use of water and the protection of the water supply, and for other public purposes, as it may deem best for the public good. Whenever, by priority of possession, rights to the use of water for mining, agricultural, manufacturing, or other purposes have vested and accrued, and the same are recognized and acknowledged by the local customs, laws, and decisions of the courts, the possessors and owners of such vested rights shall be maintained and protected in the same, and all patents granted under this Act shall be subject to any vested and accrued rights to ditches and reservoirs used in connection with such water rights as may have been acquired in the manner above described prior to April eleventh, eighteen hundred and ninety-nine.

SEC. 76. There is hereby reserved from the operation of all patents, certificates, entries, and grants by the Insular Government authorized under this Act, the right to use for the purposes of power any flow of water in any stream running through or by the land granted, the convertible power from which at ordinary low water exceeds fifty horsepower. Where the convertible power in any stream running through or running by land granted under the authority of this Act thus exceeds fifty horsepower, and there is no means of using such power except by the occupation of a part of the land granted under authority of this Act, then so much land as is reasonably necessary for the mill site or site for the power house, and for a suitable dam and site for massing the water, is hereby excepted from such grant, not exceeding four hectares, and a right of way to the nearest public highway from the land thus excepted, and also a right of way for the construction and maintenance of such flumes, aqueducts, wires, poles, or other conduits as may be needed in conveying the water to the point where its fall will yield the greatest power, or the power from the point of conversion to the point of use, is reserved as a servitude or easement upon the land granted by authority of this Act: *Provided, however*, That when the Government or any concessionaire of the Government shall take possession of land under this section which a grantee under this Act shall have paid for, supposing it to be subject to grant under this Act, said grantee shall be entitled to indemnity from the Government or the concessionaire for the amount, if any, paid by him to the Government for the land taken from him by virtue of this section: *And provided further*, That with respect to the flow of water, except for converting the same into power exceeding fifty horsepower, said grantee shall be entitled to the same use of the water flowing through or along his land that other private owners enjoy by the laws of the Philippine Islands, subject to the governmental regulation provided in the previous section. Water power privileges in which the convertible power at ordinary low water shall exceed fifty horsepower shall be disposed of only upon terms to be embodied in a special Act of the Commission until a general law shall be passed concerning the use, lease, or acquisition of such water privilege.

SEC. 77. Any person who shall willfully and knowingly submit, or cause to be submitted, any false proof, or who shall make, or cause to be made, any false affidavit in support of any application or claim in any manner respecting the public lands of the Philippine Islands, shall be deemed guilty of perjury and punished accordingly.

SEC. 78. The provisions of this Act shall extend and apply to all provinces and places of the Philippine Archipelago except the Moro Province and the Provinces of Lepanto-Bontoc, Benguet, Paragua, and Nueva Vizcaya; but the

provisions of this Act or of any chapter hereof may at any time, by resolution of the Philippine Commission, be extended over and put in force in any of the provinces or any part thereof hereby excepted from its operation.^a

Sec. 79. When this Act shall have been approved by the President of the United States and shall have received the express or implied sanction of Congress, as provided by section thirteen of the Act of Congress approved July first, nineteen hundred and two, entitled "An Act temporarily to provide for the administration of the affairs of civil government in the Philippine Islands, and for other purposes," such facts shall be made known by the proclamation of the Civil Governor of the Islands, and this Act shall take effect on the date of such proclamation.

Enacted, October 7, 1903.

NOTE—

BY THE CIVIL GOVERNOR OF THE PHILIPPINE ISLANDS.

A PROCLAMATION

Act Numbered Nine hundred and twenty-six, entitled "An Act prescribing rules and regulations governing the homesteading, selling, and leasing of portions of the public domain of the Philippine Islands, prescribing terms and conditions to enable persons to perfect their titles to public lands in said Islands, providing for the issuance of patents without compensation to certain native settlers upon the public lands, providing for the establishment of town sites and sale of lots therein, and providing for the determination by the Philippines Court of Land Registration of all proceedings for completion of imperfect titles and for the cancellation or confirmation of Spanish concessions and grants in said Islands, as authorized by sections thirteen, fourteen, fifteen, and sixty-two of the Act of Congress of July first, nineteen hundred and two, entitled 'An Act temporarily to provide for the administration of the affairs of civil government in the Philippine Islands, and for other purposes,' " having been approved by the President of the United States and by him transmitted to the Congress of the United States at the beginning of its last session, and the Congress of the United States having failed to either disapprove or amend the same at said session.

Now, therefore, I, Luke E. Wright, Civil Governor of the Philippine Islands, do hereby, pursuant to the provisions and requirements of section numbered seventy-nine of said Act Numbered Nine hundred and twenty-six, declare and proclaim that said Act is in full force and effect from this date.

In testimony whereof, I have hereunto set my hand and caused the seal of the Government of the Philippine Islands to be affixed.

Done at Manila, Philippine Islands, this twenty-sixth day of July, one thousand nine hundred and four.

LUKE E. WRIGHT,
Civil Governor.

By the Civil Governor:
F. W. CARPENTER,
Acting Executive Secretary.

Resolutions extending operation of the public land act.

The Philippine Commission has passed the following resolutions extending the application of the Public Land Act, or portions thereof, to certain territory, therein mentioned, which has heretofore been excepted from the operation of said law:

EXCERPT FROM THE MINUTES OF THE PHILIPPINE COMMISSION OF DECEMBER 22, 1905.

"Resolved, That in accordance with the provisions of section seventy-eight of Act Numbered Nine hundred and twenty-six, ordinarily known as the Public Land Act:

"(1) Said Public Land Act in its entirety be extended over and put in force throughout the district of Zamboanga, in that portion of the district of Lanao not included in the basin of Lake Lanao, and in that portion of the district of Davao included in the municipalities of Mati, Baganga, Caraga, and Cateel;

"(2) That Chapter III of said Act, relating to leases of portions of the public domain, be extended over and put in force throughout the entire district of Cotabato, with the exception of Cotabato Island, on which the town of Cotabato is located, the Island of Tamontaka, the area included within a circle whose radius is three miles and whose center is the central point in the masonry fort at Reina Regente, and the area within a circle whose radius is three miles and whose center is the central point in the masonry fort at Pikit;

^a See Resolutions extending operations of the public land act, pages 475-476.

"(3) That Chapter I of said Act, relating to homesteads on the public domain, be extended over and put in force in Cotabato Island, on which the town of Cotabato is situated, the Island of Tamontaka, the area included within a circle whose radius is three miles and whose center is the central point in the masonry fort at Reina Regente, and the area within a circle whose radius is three miles and whose center is the central point in the masonry fort at Pikit;

"(4) That Chapter III of said Act, relating to leases of portions of the public domain, be extended over and put in force in that portion of the district of Davao not included in the municipalities of Mati, Baganga, Caraga, and Cateel, with the exception of the territory embraced within a circle having a radius of five miles and whose center is the central point in the district jail at Davao;

"(5) That Chapter I of said Act, relating to homesteads on the public domain, be extended over and put in force in the municipalities of Mati, Baganga, Caraga, and Cateel, and the territory embraced within a circle having a radius of five miles and whose center is the central point in the district jail at Davao;

"(6) That Chapter III of said Act, relating to leases of portions of the public domain, be extended over and put in force in the Island of Tawi Tawi, in the district of Sulu;

"(7) That Chapter I of said Act, relating to homesteads on the public domain, be extended over and put in force in the following areas of the district of Sulu:

"The land within a circle whose radius is a mile and a half from the center of the central point of the main landward gateway in the walls of the city of Jolo, the land within a circle whose radius is a mile and a half and whose center is the central point in the masonry fort in the town of Siasi, and all other portions of the district of Sulu for the time being exempted from the provisions of the land act.

"(8) That Chapter IV of said Act, relating to free patents to native settlers, in its entirety be extended over and put in force throughout the whole of the Moro Province; and

"That the legislative council of the Moro Province is directed to make known throughout the province the foregoing resolutions and particularly the limitations imposed by the Public Land Act as to the time within which native settlers may obtain free patents by virtue of Chapter IV of the Public Land Act."

EXCERPT FROM THE MINUTES OF THE PHILIPPINE COMMISSION OF DECEMBER 22, 1905.

"The Acting President presented to the Commission the question of the extension of Act Numbered Nine hundred and twenty-six, known as 'The Public Land Act,' in its entirety, to the Province of Palawan, formerly called Paragua: After due consideration, it was, on motion,

"*Resolved*, That in accordance with the provisions of section seventy-eight of Act Numbered Nine hundred and twenty-six, ordinarily known as 'The Public Land Act,' the said Public Land Act, in its entirety, be immediately extended over and put in force throughout the entire Province of Palawan, formerly known as the Province of Paragua; and

"*Resolved further*, That the provincial board of the Province of Palawan is directed to make known the contents of the foregoing resolution, so far as practicable, to all the municipalities and settlements of the province, and to afford such assistance as may be in its power to the people to enable them to avail themselves of the provisions of the law enacted in their behalf."

EXCERPT FROM THE MINUTES OF THE PHILIPPINE COMMISSION OF DECEMBER 23, 1905.

"*Resolved*, That the provisions of Chapter IV of Act Numbered Nine hundred and twenty-six, known as 'The Public Land Act,' be, and are hereby, immediately extended to the Provinces of Benguet, Nueva Vizcaya, and Lepanto-Bontoc; and

"*Be it further resolved*, That the provincial board of the said provinces are hereby directed to take adequate means to inform the residents of the various municipalities and settlements of their provinces of the adoption of the foregoing resolution, and of the necessity of taking advantage of its provisions before January first, nineteen hundred and seven."

EXCERPT FROM MINUTES OF THE COMMISSION OF AUGUST 2, 1906.

Commissioner Worcester reminded the Commission that at the time Chapter IV of the Public Land Act was made applicable to the Province of Nueva Vizcaya the provincial board of that province requested that the act in its entirety be put in force in that province; that the Commission, however, deemed it advisable to put it in force only in that portion of the province which was chiefly inhabited by Christian natives.

He further stated that he had communicated at once with the governor of the province in order to obtain the necessary information as to the location and extent of this territory, but his letter was overlooked and a second communication had to be sent before a reply was received; that, in the meantime, the agricultural congress recommended to the Commission that the Public Land Act in its entirety be made applicable to the Christian municipalities of the province of Nueva Vizcaya. The necessary information having now been received: On motion,

"Resolved, That the Public Land Act in its entirety be, and is hereby, made applicable to the entire province of Nueva Vizcaya with the exception of the territory formerly included in the Spanish commandancias of Binatangan and Qulangan.

EXCERPT FROM MINUTES OF THE COMMISSION OF DECEMBER 29, 1906.

Resolved, That in accordance with the provisions of section seventy-eight of Act Numbered Nine hundred and twenty-six, known as the "Public Land Act," the provisions of Chapter VI of said Act, save and except subsection six of section fifty-four thereof, are hereby extended over and put in force throughout the whole of the Moro Province.

Leasing of reclaimed land.

[No. 1654.]

AN ACT To provide for the leasing of reclaimed land for commercial purposes, for the leasing of the foreshore and lands under water, and to regulate the construction of bridges over navigable waterways.

By authority of the United States, be it enacted by the Philippine Commission, that:

SECTION 1. The control and disposition of the foreshore as defined in existing law, and the title to all Government or public lands made or reclaimed by the Government by dredging or filling or otherwise throughout the Philippine Islands, shall be retained by the Government without prejudice to vested rights and without prejudice to rights conceded to the city of Manila in the "Luneta Extension."

SEC. 2. (a) The Secretary of the Interior shall cause all Government or public lands made or reclaimed by the Government by dredging or filling or otherwise to be divided into lots or blocks, with the necessary streets and alleyways located thereon, and shall cause plats and plans of such survey to be prepared and filed in the Bureau of Lands.

(b) Upon the completion of such plats and plans the Governor-General shall give notice to the public that such parts of the lands so made or reclaimed as are not needed for public purposes will be leased for commercial and business purposes, and upon receipt of an application or applications for a lease or leases, the Governor-General shall designate and specify certain portions of the land for such use, and shall give notice by public advertisement that such applications have been made and that the Government will lease lots or blocks, to be specified in said advertisement, for commercial and business purposes, such leases to run for a period of ninety-nine years at a rental of three per centum per annum of the appraised value of the parcel of land leased, the appraisal to be made by the Director of Lands subject to approval by the Secretary of the Interior and conditioned that a new appraisal of said land so leased shall be made in the same manner ten years from the date of the lease and every ten years thereafter, and that the rental after such appraisal shall be based upon the new appraised value at the same rate per centum per annum.

(c) If after any reappraisal a tenant shall consider the new valuation to be excessive, he shall have the right, within three months, to appeal to the Court of First Instance of the district in which the land is situated, and the said court is hereby given jurisdiction to determine the appraisal and fix a just valuation for the land for the period of ten years. Either party shall have the right to appeal from the Court of First Instance to the Supreme Court of the Philippine Islands: *Provided, however*, That the tenant shall pay rent on the basis of the reappraisal pending final determination of the matter by said Court of First Instance. Should the Court of First Instance determine to fix a valuation for the land lower than that fixed in the reappraisal the tenant shall be entitled to a refund of the excess rent paid by him on the basis of such reappraisal.

(d) The lease of the said lands shall be executed by the Director of Lands and approved by the Secretary of the Interior, and shall specifically provide, among other things, that improvements thereon of a kind to be approved by the Consulting Architect, as provided in subsection (f) of this section, shall be commenced within twelve months of the date of the execution of the lease and shall be completed within a time to be fixed in said lease, and that in case of failure to make such improvements within the time prescribed by the lease or to comply with any or all of the terms and conditions of said lease the same shall thereupon be forfeited, and that all improvements made on the leased property shall vest in and become the property of the Government of the Philippine Islands: *Provided, however*, That the Governor-General may, in his discretion, and upon such terms as he may prescribe, waive the forfeiture herein provided for, or extend the time within which said improvements shall be commenced and completed.

Every such lease shall also contain a provision for the payment of the tax or taxes levied on said land or improvements and providing that upon the failure of the lessee to pay any such tax or taxes or any part thereof the lease shall forthwith cease and determine.

(e) The leases above provided for shall be disposed of to the highest and best bidder therefor, subject to such regulations and safeguards as the Governor-General may by executive order prescribe.

(f) Plans for buildings or improvements shall be approved by the Consulting Architect, and no buildings or improvements shall be permitted until such approval has been obtained in writing. Such improvements shall also be subject to the ordinances of the proper municipality. In case of difference or dispute between the Consulting Architect and the lessee, final decision shall be made by the Governor-General.

Sec. 3. (a) The original cost of the construction of streets, alleyways, and curbing on such reclaimed lands shall be borne by the Insular Government. The cost of putting in sewers and water mains and keeping in repair the streets, alleyways, and curbing constructed at the expense of the Insular Government shall be borne by the municipality in which such lands are situated, and it shall be the duty of such municipality to maintain and keep in repair streets, alleyways, and curbing constructed by the Insular Government as herein provided.

(b) Franchises for the use of said streets and alleyways on said lands for private or public purposes may be granted by the Insular Government or, subject to the approval of the Governor-General, by the municipality in which said lands are situated. Franchises granted under this section for the construction and operation of street railways, electric light and power, and telephone lines shall be subject to the provisions of the law then in force governing all such franchises.

Sec. 4. All lands leased under the provisions of the foregoing sections of this Act, and all improvements thereon, shall be subject to local taxation against the lessees, their heirs, executors, administrators, successors, or assigns, to the same extent as if such lessees, their heirs, executors, administrators, successors, or assigns, were the owners of both land and improvements.

Sec. 5. Upon receipt of an application or applications for the lease of any portion of the foreshore or lands under water in the Philippine Islands for the purpose of erecting and maintaining wharves, docks, piers, marine railways, or other appropriate structures, and upon the recommendation of the Secretary of Commerce and Police, the Governor-General may designate and specify such portions of the foreshore or lands under water for such use, and shall give notice by public advertisement that such applications have been made and that the Government will lease such portion of the foreshore, to be specified in said

advertisement, for wharves, docks, piers, marine railways, or other appropriate structures for a term not to exceed ninety-nine years, with the right on the part of the lessee to erect and maintain such wharves, docks, piers, marine railways, or other appropriate structures, or to make such other beneficial use of such leased foreshore or lands under water as may be specified in the lease, subject, however, to all vested rights or easements of owners of lands adjacent to such foreshore or lands under water.

Sec. 6. The lease mentioned in the section immediately preceeding shall, among other things, contain the following provisions:

(a) For the payment by the lessee, his heirs, executors, administrators, successors, or assigns, of an annual rental, which shall be fixed at not less than one per centum of the appraised value of the improvements which the lessee, his heirs, executors, administrators, successors, or assigns, may be authorized to make by the lease. Such appraisal shall be made in the same manner and subject to the same conditions as provided in this Act in the case of a lease by the Government of made or reclaimed lands.

(b) That plans and specifications of all wharves or other marine structures authorized by the lease shall be subject to the approval of the Director of Navigation.

(c) That on the termination of the lease or any extension thereof, all the improvements made by the lessee, his heirs, executors, administrators, successors, or assigns, shall vest in and become the property of the Government of the Philippine Islands.

(d) For the regulation by the Secretary of Commerce and Police of all rates and fees charged to the public, and for the submission to him annually for approval of all tariffs of such rates and fees.

(e) For the continuance of the easements of the coast police and other easements reserved in the Law of Waters now in force in the Philippine Islands.

Sec. 7. Upon the recommendation of the Secretary of Commerce and Police and the approval of the Governor-General, every steamship company granted a lease of the foreshore as hereinbefore provided may, by proper condemnation proceedings, acquire, for the purpose of erecting wharves or other structures for the better handling of its steamship business, land not under water adjacent to the foreshore for which such company obtained a lease.

In order to secure the approval of the Governor-General, such steamship company shall file with the Secretary of Commerce and Police an application stating in detail the situation and extent of the land desired, the nature and extent of the wharves or other structures to be erected on the land not under water adjacent to the foreshore, and the character of the business and use to which the applicant desires to put such land.

Sec. 8. In order to encourage municipalities and provinces to construct wharves, piers, docks, and other structures for the convenience of shipping, the Insular Government, through the Bureau of Navigation, shall, without cost, provide such municipalities and provinces with plans and specifications for the construction thereof.

Sec. 9. The public good requiring the speedy enactment of this bill, the passage of the same is hereby expedited in accordance with section two of "An Act prescribing the order of procedure by the Commission in the enactment of laws," passed September twenty-sixth, nineteen hundred.

Sec. 10. This Act shall take effect on its passage.

Enacted, May 18, 1907.

Free Patents.

[No. 1573.]

AN ACT Extending from January first, nineteen hundred and seven, to January first, nineteen hundred and nine, the time within which free patents may be granted to native settlers upon unreserved and unappropriated agricultural public lands.

By authority of the United States, be it enacted by the Philippine Commission, that:

SECTION 1. Any native of the Philippine Islands now an occupant and cultivator of unreserved and unappropriated agricultural public lands, as defined by the act of Congress of July first, nineteen hundred and two, who has continuously occupied and cultivated such lands either by himself or through his

ancestors since August first, eighteen hundred and ninety-eight, or, who, prior to August first, eighteen hundred and ninety-eight, continuously occupied and cultivated such lands for three years immediately prior to said date, and who has been continuously since July fourth, nineteen hundred and two, until the date of the taking effect of this Act an occupier and cultivator of such lands, shall be entitled to have a patent issued to him without compensation for such tract of land, not exceeding sixteen hectares, in the manner provided in Chapter Four of Act Numbered Nine hundred and twenty-six, "The Public Land Act," provided that his application therefor be filed as provided in said chapter prior to January first, nineteen hundred and nine, instead of January first, nineteen hundred and seven, as now provided by section thirty-three of "The Public Land Act," and said section thirty-three is hereby so amended that the words "nineteen hundred and seven" shall be stricken out and in lieu thereof shall be inserted the words "nineteen hundred and nine."

SEC. 2. The public good requiring the speedy enactment of this bill, the passage of the same is hereby expedited in accordance with section two of "An Act prescribing the order of procedure by the Commission in the enactment of laws," passed September twenty-sixth, nineteen hundred.

SEC. 3. This Act shall take effect on its passage.

Enacted, December 13, 1906.

Reservations of Land for Public Use.

[No. 627.]

AN ACT To bring immediately under the operation of "The Land Registration Act" all lands lying within the boundaries lawfully set apart for military reservations, and all lands desired to be purchased by the Government of the United States for military purposes, as amended by Act No. 806.

By authority of the United States, be it enacted by the Philippine Commission, that:

SECTION 1. (*As amended by Act No. 806.*) All lands, or any interest therein, within the Philippine Islands lying within the boundaries of the areas now or hereafter set apart and declared to be military reservations shall be forthwith brought under the operations of "The Land Registration Act," and such of said lands, and interests therein as shall not be determined to be public lands shall become registered land in accordance with the provisions of said "The Land Registration Act," under the circumstances hereinafter stated.

SEC. 2. (*As amended by Act No. 806.*) Whenever the Commanding General of the United States Army, Division of the Philippines, shall certify to the Civil Governor that all public lands within limits by him described in the Philippine Islands have been reserved by the President of the United States for military purposes, and are lawfully announced and declared military reservations, it is hereby made the duty of the Civil Governor in writing to notify the Judge of the Court of Land Registration that such public lands have been reserved for military purposes and announced and declared to be military reservations, and that all private lands, or interests therein, within the limits described, ought forthwith to be brought within the operation of "The Land Registration Act," and to become registered land within the meaning of said "The Land Registration Act."

SEC. 3. (*As amended by Act No. 806.*) Immediately upon receipt of the notice from the Civil Governor in the preceding section mentioned it shall be the duty of the Judge of the Court of Land Registration to issue a notice, stating that the lands within the limits aforesaid have been reserved for military purposes, and announced and declared to be military reservations, and that claims for all private lands and interests therein, within the limits aforesaid, must be presented for registration under "The Land Registration Act" within six calendar months from the date of issuing the notice, and that all lands and interests therein within the limits aforesaid not so presented within the time therein limited will be conclusively adjudged to be public lands, and all claims on the part of private individuals for such lands or an interest therein not so presented will

be forever barred. The clerk of the Court of Land Registration shall immediately upon the issuing of such notice by the judge cause the same to be published once a week for three successive weeks in two newspapers, one of which newspapers shall be in the English language, and one in the Spanish language in the city or province where the land lies, and, if there be no such Spanish or English newspapers having a general circulation in the city or province wherein the land lies, then it shall be a sufficient compliance with this section if the notice be published, as herein provided, in a daily newspaper in the Spanish language and one in the English language, in the city of Manila, having a general circulation. The clerk shall also cause a duly attested copy of the notice in the Spanish language to be posted in a conspicuous place at each angle formed by the lines of the limits of the land so reserved. The clerk shall also issue and cause to be personally served the notice in the Spanish language upon every person living upon or in visible possession of any part of the military reservation. If the person in possession is the head of a family living upon the land, it shall be sufficient to serve the notice upon him, and if he is absent it shall be sufficient to leave a copy at his usual place of residence. The clerk shall certify the manner in which the notices have been published, posted, and served, and his certificate shall be conclusive proof of such publication, posting, and service, but the court shall have power to cause such further notice to be given as in its opinion may be necessary.

SEC. 4. (*As amended by Act No. 806.*) All claims for private lands and interests therein within the limits of such military reservation not presented to the Court of Land Registration within six months from the date of the notice in the previous section provided shall be forever barred, and the lands and interests therein shall be deemed to be public and not private property: *Provided, nevertheless*, That it shall be in the power of the Court of Land Registration, on suitable application, filed within three months after the expiration of the six months first aforesaid, to allow an application and claim to be filed upon proof that the failure to file it within the six months' limitation resulted from fraud, accident, mistake, or excusable negligence.

SEC. 5. Upon the filing of claims and applications for registration in the Court of Land Registration, the same procedure shall be adopted as is by "The Land Registration Act" provided for other claims and applications; but in case of all claims and applications which are finally dismissed, the judgment shall be that the lands embraced therein are public lands, unless the same shall be included within other claims or applications which are favorably acted upon by the court. It shall be the duty of the court to expedite proceedings under this Act, and give to them precedence over other claims for registration under "The Land Registration Act." All rights of appeal secured by "The Land Registration Act" shall be applicable to proceedings under this Act.

SEC. 6. The provisions of sections thirty-eight, thirty-nine, forty, forty-one, and forty-two of Act Numbered One hundred and ninety, entitled "An Act providing a code of procedure in civil actions and special proceedings in the Philippine Islands," are hereby made applicable to all lands, not more than sixteen hectares in extent, within the limits of any military reservation, notwithstanding such lands would be public lands were it not for titles acquired in the manner stated in said sections thirty-eight, thirty-nine, forty, forty-one, and forty-two.

SEC. 7. (*As amended by Act No. 806.*) When the Commanding General of the United States Army, Division of the Philippines, shall certify to the Civil Governor that the military authorities of the United States wish to acquire by purchase for military purposes property owned by private individuals in the Philippine Islands, and not within the boundaries set apart for military reservations, and shall describe specifically the lands so desired to be purchased, and shall certify that the titles to the same are so uncertain that it is impracticable to determine who the true individual owners thereof are, and ask relief in accordance with the provisions of this section, it is hereby made the duty of the Civil Governor in writing to notify the judge of the Court of Land Registration of such certification, and request that the lands mentioned forthwith be brought under the operation of "The Land Registration Act," and to become registered land within the meaning thereof. Immediately upon the receipt of such notice from the Civil Governor, it shall be the duty of the judge of the Court of Land Registration to issue a notice stating the contents of the notice received by him from the Civil Governor, and that claims for all private lands, and interests therein, within the limits described in such notice, must be presented for registra-

tration under "The Land Registration Act" within six calendar months from the date of issuing notice, and that all lands and interests therein, within the limits aforesaid, not so presented within the time therein limited, will be conclusively adjudged to be public lands, and all claims on the part of private individuals for such lands or an interest therein not so presented will be forever barred. And thereupon such proceedings shall be had by the Court of Land Registration for the determination of the true ownership of the lands included in such limits as are provided in cases of land lying within the boundaries of military reservations, as set forth in sections three, four, and five of this Act; and the provisions of section six are likewise made applicable to all lands in this section mentioned.

SEC. 8. The public good requiring the speedy enactment of this bill, the passage of the same is hereby expedited in accordance with section two of "An Act prescribing the order of procedure by the Commission in the enactment of laws," passed September twenty-sixth, nineteen hundred.

SEC. 9. This Act shall take effect on its passage.

Enacted, February 9, 1903.

[No. 1138.]

AN ACT To bring immediately under the operation of the Land Registration Act all lands lying within the boundaries lawfully set apart for naval reservations, and all lands desired to be purchased by the Government of the United States for naval purposes.

By authority of the United States, be it enacted by the Philippine Commission, that:

SECTION 1. The provisions of Act Numbered Six hundred and twenty-seven, entitled "An Act to bring immediately under the operation of the Land Registration Act all lands lying within the boundaries lawfully set apart for military reservations, and all lands desired to be purchased by the Government of the United States for military purposes," are hereby made applicable to all lands or buildings or any interest therein within the Philippine Islands lying within the boundaries of the areas now or hereafter set apart and declared to be naval reservations: *Provided, however,* That wherever the word "military" appears in said Act Numbered Six hundred and twenty-seven there shall be substituted the word "naval" for the purposes of this Act: *And provided further,* That wherever the words "commanding general of the United States Army, Division of the Philippines," appear in said Act Numbered Six hundred and twenty-seven there shall be substituted the words "commander in chief of the United States Asiatic Fleet," for the purposes of this Act.

SEC. 2. The method of procedure provided in Act Numbered Six hundred and twenty-seven for settling the titles to lands within military reservations, or which are sought to be purchased for military purposes, is hereby made applicable to naval reservations and to lands which the naval authorities of the United States wish to acquire by purchase for naval purposes, owned by private individuals and not within the boundaries set apart for naval reservations, and in case of proceedings in accordance with the provisions of this Act, claims for private lands, buildings, and interests within the limits of naval reservations not presented to the Court of Land Registration, as provided in said Act Numbered Six hundred and twenty-seven, shall be forever barred, and the lands, buildings, and interests therein shall be deemed to be public and not private property, in accordance with the provisions of said Act Numbered Six hundred and twenty-seven.

SEC. 3. The public good requiring the speedy enactment of this bill, the passage of the same is hereby expedited in accordance with section two of "An Act prescribing the order of procedure by the Commission in the enactment of laws," passed September twenty-sixth, nineteen hundred.

SEC. 4. This Act shall take effect on its passage.

Enacted, April 30, 1904.

[No. 648.]

AN ACT Authorising the Civil Governor to reserve for civil public purposes, and from sale or settlement, any part of the public domain not appropriated by law for special public purposes, until otherwise directed by law, and extending the provisions of Act Numbered Six hundred and twenty-seven so that public lands desired to be reserved by the Insular Government for public uses, or private lands desired to be purchased by the Insular Government for such uses may be brought under the operation of the Land Registration Act.

By authority of the United States, be it enacted by the Philippine Commission, that:

SECTION 1. The Civil Governor is hereby authorized and empowered by executive order to reserve from settlement or public sale and for specific public uses any of the public domain of the Philippine Islands the use of which is not otherwise directed by law; and thereafter such land shall not be subject to settlement or sale and shall be used for the specific purposes directed by such executive order until otherwise provided by law.

SEC. 2. Whenever the Civil Governor, in writing, shall certify that all public lands within limits by him described in the Philippine Islands are reserved for civil public uses, either of the Insular Government or of any provincial or municipal government, and shall give notice thereof to the judge of the Court of Land Registration, it shall be the duty of the judge of said court to proceed to issue notice thereof and that claims for all private lands, buildings and interests therein, within said limits must be presented for registration under "The Land Registration Act" in the manner provided in Act Numbered Six hundred and twenty-seven, entitled "An Act to bring immediately under the operation of 'The Land Registration Act' all lands lying within the boundaries lawfully set apart for military reservations, and all lands desired to be purchased by the Government of the United States for military purposes." The procedure for the purpose of this Act and the legal effects thereof, shall thereupon be in all respects as provided in sections three, four, five, and six of said Act Numbered Six hundred and twenty-seven.

SEC. 3. Whenever the Civil Governor shall certify that the civil authorities, either insular, provincial, or municipal, wish to acquire by purchase for public use property owned by private individuals in the Philippine Islands, and not within the boundaries of public lands set apart for such use in accordance with the preceding section, and shall describe specifically the land so desired to be purchased, and further certify that the titles to the same are so uncertain that it is impracticable to determine who are the true individual owners thereof, it shall be the duty of the judge of the Court of Land Registration upon receipt of such certification to proceed to bring the lands mentioned forthwith under the operation of "The Land Registration Act" in the manner and with the legal effect provided in section seven of said Act Numbered Six hundred and twenty-seven.

SEC. 4. The public good requiring the speedy enactment of this bill the passage of the same is hereby expedited in accordance with section two of "An Act prescribing the order of procedure by the Commission in the enactment of laws," passed September twenty-sixth, nineteen hundred.

SEC. 5. This Act shall take effect on its passage.

Enacted, March 3, 1903.

Land Grants from Moro Sultans or Dattos.

[No. 718.]

AN ACT Making void land grants from Moro sultans or dattos or from chiefs of non-Christian tribes when made without governmental authority or consent.

By authority of the United States, be it enacted by the Philippine Commission, that:

SECTION 1. All grants, deeds, patents, leases, or other instruments of conveyance purporting to convey from Moro sultans or dattos, or from chiefs of non-Christian tribes, lands situate in the Philippine Archipelago or rights of property, privileges, or easements appertaining to, or growing out of, land therein, made without the authority of the Spanish Government while the

Philippine Archipelago was under the sovereignty of Spain, or without the consent of the United States Government or of the Insular Government since the sovereignty of the Archipelago of the Philippines was transferred by the Treaty of Paris from Spain to the United States, and not based on any lawful patent or grant of the Government of Spain or the United States, or of the Insular Government, whether such grants, deeds, patents, leases, or other instruments of conveyance were made before the passage of this Act or shall be made after its passage, being made without any lawful authority or ownership, are hereby declared to be illegal, void, and of no effect.

SEC. 2. The public good requiring the speedy enactment of this bill, the passage of the same is hereby expedited in accordance with section two of "An Act prescribing the order of procedure by the Commission in the enactment of laws," passed September twenty-sixth, nineteen hundred.

SEC. 3. This Act shall take effect on its passage.

Enacted, April 4, 1903.

Internal revenue law.

[No. 1189.]

AN ACT To provide revenue for the support of the insular, provincial, and municipal governments by internal taxation.

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ARTICLE XI.

STAMP TAXES ON SPECIFIED OBJECTS.

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SEC. 116. There shall be levied, collected, and paid for and in respect to the several bonds, debentures, or certificates of stock and of indebtedness, and other documents, instruments, matters, and things mentioned and described in this section, or for or in respect to the vellum, parchment, or paper upon which such instruments, matters, or things or any of them shall be written or printed by any person or persons who shall make, sign, or issue the same, on and after January first, nineteen hundred and five, the several taxes following:

* * * * *

Eleventh. (a) On each power of attorney or proxy for voting at any election for officers of any incorporated company or association, except railroad companies or associations organized for charitable or literary purposes or to manage public cemeteries, twenty centavos; (b) on each power of attorney to sell and convey real estate, or to rent and lease the same, to receive or to collect the rent therefrom, to sell or transfer any stocks, bonds, or securities, or to collect any dividends or interests therein, or to perform any and all other acts not hereinbefore specified, twenty centavos: *Provided*, That no stamps shall be required upon any papers necessary for use in the collection of claims from, or by, the Insular Government, or from, or by, any provincial or municipal government.

Twelfth. On each lease, agreement, memorandum, or contract for the hire, use, or rent of any land or tenements, or portions thereof, (a) if executed for a period of time not more than one year, twenty centavos; (b) if executed for a period of time more than one year and not more than three years, fifty centavos; (c) if executed for a period of time more than three years, one peso.

Thirteenth. On every mortgage or pledge of lands, estate, or property, real or personal, heritable or movable, whatsoever, where the same shall be made as a security for the repayment of any definite and certain sum of money lent at the time or previously due and owing or forborne to be paid being payable, and on any conveyance of land, estate, or property whatsoever in trust, or to be sold or otherwise converted into money, which shall be and intended only as security, either by express stipulation or otherwise, when the amount for which the mortgage or deed of trust is given is not less than one thousand pesos nor more than three thousand pesos, fifty centavos, and on each three thousand pesos or fractional part thereof, in excess of nine thousand pesos, fifty centavos additional: *Provided*, That upon each and every assignment or transfer of any mortgage, lease, or policy of insurance, or the renewal or

continuance of any agreement, contract, or charter by altering or otherwise, a stamp tax shall be levied, collected, and paid at the same rate as that imposed on the original instrument: *And provided further*, That whenever any bond or note shall be secured by a mortgage or deed of trust but one tax shall be collected upon such papers and such tax shall be at the highest rate imposed in this section on such mortgage or bond or note as the case may be.

Fourteenth. On all conveyances, deeds, instruments, or writings whereby any lands, tenements, or other realty sold shall be granted, assigned, transferred, or otherwise conveyed to the purchaser or purchasers, or to any other person or persons designated by such purchaser or purchasers, when the true consideration or value received for such realty is more than two hundred pesos, but not more than one thousand pesos, fifty centavos; and for each additional one thousand pesos or fractional part thereof, of such consideration, fifty centavos: *Provided*, That in sales of encumbered property the tax shall be collected on the net amount of the consideration after deducting the amount of the encumbrance: *And provided further*, That original certificates under the Land Registration Act and patents to lands granted under the Public Land Act shall be exempted from the payment of this tax.

The tax imposed in this paragraph shall be paid and assessed on the complete and full amount of money or other valuable consideration actually paid or delivered in exchange for such lands, tenements, or other realty; and the Collector of Internal Revenue, provincial treasurers, and other revenue officers, when there is good reason to believe that a fraud has been perpetrated on the revenues through the declaration of a fictitious consideration in any such conveyance, deed, instrument, or writing, shall from the real-estate assessment rolls, or from any other reliable source, assess the lands, tenements, or other realty at their true market value and the tax on such conveyance, deed, or instrument shall be assessed and collected on such true market value of the realty conveyed; and any person who, with the intent to defraud the revenues, places a fictitious valuation on any realty conveyed and subject to the tax imposed in this paragraph, or any valuation which shall be less than the actual amount of money or other valuable thing received or delivered in payment for such realty, shall, in addition to the payment of the tax assessed on the actual consideration received or true market value of the realty conveyed, forfeit and pay a sum equal to twice the amount of such tax.

Fifteenth. The fees prescribed in section one hundred and fourteen of the Land Registration Act, and the amendments thereto, shall be paid in the amounts and to the officials provided by said Act and its amendments, and shall be accounted for as provided in said Act.

* * * * *

Sec. 153. This Act shall take effect on the first day of August, nineteen hundred and four.

Enacted, July 2, 1904.

FRIAR LANDS.

ADMINISTRATION, LEASING AND SALE.

The Friar Lands Act—No. 1120.

AN ACT Providing for the administration and temporary leasing and sale of certain haciendas and parcels of land, commonly known as friar lands, for the purchase of which the government of the Philippine Islands has recently contracted, pursuant to the provisions of sections sixty-three, sixty-four, and sixty-five of an Act of the Congress of the United States entitled "An Act temporarily to provide for the administration of the affairs of Civil Government in the Philippine Islands, and for other purposes," approved on the first day of July, nineteen hundred and two, as amended by Act No. 1287.

Whereas, pursuant to the provisions of sections sixty-three, sixty-four, and sixty-five of an Act of the Congress of the United States, entitled "An Act temporarily to provide for the administration of the affairs of Civil Government in the Philippine Islands, and for other purposes," approved July first, nineteen hundred and two, the Government of the Philippine Islands, on the twenty-second day of December, nineteen hundred and three, entered into contracts with the Philippine Sugar Estates Development Company, Limited, La Sociedad Agrícola de Ultramar, the British-Manila Estates Company, Limited, and the Recoleta Order of the Philippine Islands, for the purchase of about one hundred and sixty-four thousand one hundred and twenty-seven hectares of land, situated in the Provinces of La Laguna, Bulacan, Cavite, Bataan, Cebu, Rizal, Isabela, and Mindoro, for the aggregate sum of seven million two hundred and thirty-nine thousand seven hundred and eighty-four dollars and sixty-six cents, money of the United States; and

Whereas in said contracts of purchase it was provided, among other things, that the Government of the Philippine Islands should have a period of six months from the date of said contracts within which to examine the titles to said lands and also within which to survey the same in order to ascertain whether there is the quantity of land specified in said contracts, and, in the event there is not, that a proportionate reduction shall be made in the amounts agreed to be paid therefor; and it was further provided in said contracts that the said parties, so agreeing to sell, obligated themselves to convey good and indefeasible titles to said lands by proper conveyances; and

Whereas by said section sixty-five of said Act of Congress the Government of the Philippine Islands is empowered to lease the said lands after their acquisition for a period not exceeding three years, and to sell the same on such terms and conditions as it may prescribe, subject to the limitations and conditions contained in said Act of Congress: *Provided*, That all deferred payments and the interest thereon shall be payable in the money prescribed for the payment of principal and interest of the bonds authorized to be issued and sold for the purpose of realizing the money necessary to pay for said lands by section sixty-four of said Act of Congress, and that said deferred payments shall bear interest at the rate borne by said bonds: *And provided further*, That all moneys realized or received from the sales or other disposition of said lands, or by reason thereof, shall constitute a trust fund for the payment of principal and interest of said bonds, and also constitute a sinking fund for the payment of said bonds at their maturity: *And provided further*, That actual settlers and occupants at the time said lands are acquired by the Government shall have the preference over all others to lease, purchase, or acquire their holdings within such reasonable time as may be determined by said Government; and

Whereas the said lands are not "public lands" in the sense in which those words are used in the Public Land Act, Numbered Nine hundred and twenty-

six, and can not be acquired or leased under the provisions thereof, and it is necessary to provide proper agencies for carrying out the terms of said contracts of purchase and the requirements of said Act of Congress with reference to the leasing and selling of said lands and the creation of a sinking fund to secure the payment of the bonds so issued: Now, therefore,

By authority of the United States, be it enacted by the Philippine Commission, that:

SECTION 1. The Civil Governor is authorized and directed to have careful examination made to ascertain the sufficiency and soundness of the titles to said land so contracted to be purchased by the Government of the Philippine Islands from the said corporations as set forth in the preamble hereof.

His action in employing the firm of Del Pan, Ortigas and Fisher, attorneys at law in the city of Manila, to make such examination and also to perform all legal services required of them in completing such purchases and thereafter in the leasing and selling of said lands as hereinafter provided, they to be compensated for their services at the rate of five thousand five hundred dollars per annum, payable monthly, for such time as in the opinion of the Civil Governor their services may be needed, is hereby approved and confirmed.

SEC. 2. The Consulting Engineer to the Commission is hereby directed to have careful surveys made of the said haciendas and tracts of land in order to ascertain with accuracy and certainty whether there is the amount of land in each of said haciendas and tracts specified in said contracts, and for that purpose he is empowered to put in the field and maintain the necessary surveying parties, and any funds in his hands at the present time not in terms devoted to defraying the cost of specific public works are hereby declared available for that purpose. As soon as these surveys shall have been completed he shall make report of the results thereof to the Civil Governor. Such steps as have already been taken by the Consulting Engineer by direction of the Civil Governor looking to the survey of said haciendas and lands are approved and confirmed.

SEC. 3. The firm of Del Pan, Ortigas and Fisher is also directed, as soon as the examination of the title deeds to said property shall have been completed, to make report of the result of their investigations in that behalf to the Civil Governor, and under his direction to supervise the final deeds of conveyance of said lands by said corporations to the Government of the Philippine Islands. The Civil Governor is also directed to submit their report together with the said deeds to the Attorney-General for his opinion.

SEC. 4. The Civil Governor is hereby empowered, when it shall have been ascertained that the titles to said lands are perfect and indefeasible and proper instruments of conveyance are tendered by said corporations, to direct the payment to the corporations named in the preamble of the several sums agreed to be paid for said lands, and to that end to draw the warrants of the Government of the Philippine Islands upon the sum realized from the sale of the bonds issued and sold as provided in Act Numbered Ten hundred and thirty-four.

SEC. 5. When the titles to said lands are finally vested in the Government of the Philippine Islands, they shall be under the immediate control and direction of the Bureau of Public Lands. The Chief of the Bureau of Public Lands is empowered and directed, pending the completion of the purchase of said lands, to receive, take charge of, and carefully preserve the said contracts of sale and purchase and all muniments, documents, title deeds, or other papers pertaining to said lands, and all field notes, surveys, and other data relating thereto, and also the deeds of conveyance hereafter made pursuant to the terms of said contracts of sale and purchase, and thereafter to keep and preserve the same, except as required for registration of said lands.

SEC. 6. (*As amended by Act No. 1287.*) The title deeds and instruments of conveyance pertaining to the lands in each province, when executed and delivered by said grantors to the Government and placed in the keeping of the Chief of the Bureau of Public Lands, as above provided, shall be by him transmitted to the register of deeds of each province in which any part of said land lies, for registration in accordance with law. "But before transmitting the title deeds and instruments of conveyance in this section mentioned to the register of deeds of each province for registration, the Chief of the Bureau of Public Lands shall record all such deeds and instruments at length in one or more books to be provided by him for that purpose and retained in the Bureau of Public Lands. He shall certify on each record the date on which the same was made. Copies

of said records made by the Chief of the Bureau of Public Lands, when duly certified by him, shall be received in all courts of the Philippine Islands as sufficient evidence of the contents of the instruments so recorded whenever it is not practicable to produce the originals in court."

SEC. 7. Upon the vesting of the titles to said lands in the Government of the Philippine Islands by proper deeds of conveyance, or sooner if so directed by the Civil Governor, the Chief of the Bureau of Public Lands shall ascertain the names and residences of the actual, bona fide settlers and occupants then in possession of said lands or of any portion of them, together with the extent of their several holdings and the character and value thereof. He is also directed to ascertain from said occupants whether they desire to purchase their holdings upon the terms prescribed in the succeeding sections.

SEC. 8. In case any occupant in possession does not desire to purchase his holding, but does desire to lease the same, then it shall be the duty of the Chief of the Bureau of Public Lands, after vesting of title, to see that such occupant attorns in due form to the Government and enters into a lease with the usual covenants and agrees to pay a reasonable rental for the use and occupation of his holding. Such rental shall be fixed by the Chief of the Bureau of Public Lands, but in no instance shall any lease be made for a longer term than three years.

SEC. 9. In the event the Chief of the Bureau of Public Lands should find any of the said lands vacant, he is directed to take possession and charge thereof, and he may either lease such unoccupied lands for a term not exceeding three years or offer the same for sale, as in his judgment may seem for the best interests of the Government, and in making such sales he shall proceed as provided in chapter two of the Public Land Act.

SEC. 10. Should he find any of the said lands in possession of a person or persons declining either to buy or to rent, as above set forth, he shall take possession thereof if he can do so peaceably, and if not he shall begin proper legal proceedings in the Court of Land Registration to settle title and to oust him or them from his or their holdings and, upon adjudication in favor of the Government, shall likewise take possession of the same with the same power and authority as though originally vacant. He shall not, however, sell any of the main hacienda houses or other large and substantial buildings save upon a resolution of the Commission authorizing him so to do.

SEC. 11. Should any person who is the actual and bona fide settler upon and occupant of any portion of said lands at the time the same is conveyed to the Government of the Philippine Islands desire to purchase the land so occupied by him, he shall be entitled to do so at the actual cost thereof to the Government, and shall be allowed ten years from the date of purchase within which to pay for the same in equal annual installments, if he so desires, all deferred payments to bear interest at the rate of four per centum per annum.

SEC. 12. It shall be the duty of the Chief of the Bureau of Public Lands by proper investigation to ascertain what is the actual value of the parcel of land held by each settler and occupant, taking into consideration the location and quality of each holding of land and any other circumstances giving it value. The basis of valuation shall likewise be, so far as practicable, such that the aggregate of the values of all the holdings included in each particular tract shall be equal to the cost to the Government of the entire tract, including the cost of surveys, administration, and interest upon the purchase money to the time of sale. When the cost thereof shall have been thus ascertained, the Chief of the Bureau of Public Lands shall give the said settler and occupant a certificate which shall set forth in detail that the Government has agreed to sell to such settler and occupant the amount of land so held by him, at the price so fixed, payable as provided in this Act at the office of the Chief of the Bureau of Public Lands, in gold coin of the United States or its equivalent in Philippine currency, and that upon the payment of the final installment together with all accrued interest the Government will convey to such settler and occupant the said land so held by him by proper instrument of conveyance, which shall be issued and become effective in the manner provided in section one hundred and twenty-two of the Land Registration Act. The Chief of the Bureau of Public Lands shall, in each instance where a certificate is given to the settler and occupant of any holding, take his formal receipt showing the delivery of such certificate, signed by said settler and occupant.

SEC. 13. The acceptance by the settler and occupant of such certificate shall be considered as an agreement by him to pay the purchase price so fixed and in the installments and at the interest specified in the certificate, and he shall by

such acceptance become a debtor to the Government in that amount together with all accrued interest. In the event that any such settler and occupant may desire to pay for his holding of said lands in cash, or within a shorter period of time than that above specified, he shall be allowed to do so, and if payment be made in cash the lands shall at once be conveyed to him as above provided. But if purchase is made by installments, the certificate shall so state in accordance with the facts of the transaction: *Provided, however*, That every settler and occupant who desires to purchase his holding must enter into the agreement to purchase such holding by accepting the said certificate and executing the said receipt whenever called on so to do by the Chief of the Bureau of Public Lands, and a failure on the part of the settler and occupant to comply with this requirement shall be considered as a refusal to purchase, and he shall be ousted as above provided and thereafter his holding may be leased or sold as in case of unoccupied lands: *And provided further*, That the Chief of the Bureau of Public Lands in his discretion may require of any settler and occupant so desiring to purchase that, pending the investigation requisite to fix the precise extent of his holding and its cost, he shall attorn to the Government as its tenant and pay a reasonable rent for the use of his holding; but no such lease shall be for a longer term than three years, and refusal on the part of any settler and occupant so desiring to purchase to execute a lease pending such investigation shall be treated as a refusal either to lease or to purchase, and the Chief of the Bureau of Public Lands shall proceed to oust him as in this Act provided.

SEC. 14. It shall be the duty of the Chief of the Bureau of Public Lands to collect and receive all rent and installments of purchase money and interest thereon due and payable under the provisions of this Act, and to give proper receipts and acquittances therefor and make proper record thereof in the books of his office.

SEC. 15. The Government hereby reserves the title to each and every parcel of land sold under the provisions of this Act until the full payment of all installments of purchase money and interest by the purchaser has been made, and any sale or incumbrance made by him shall be invalid as against the Government of the Philippine Islands and shall be in all respects subordinate to its prior claim.

SEC. 16. In the event of the death of a holder of a certificate the issuance of which is provided for in section twelve hereof, prior to the execution of a deed by the Government to any purchaser, his widow shall be entitled to receive a deed of the land stated in the certificate upon showing that she has complied with the requirements of law for the purchase of the same. In case a holder of a certificate dies before the giving of the deed and does not leave a widow, then the interest of the holder of the certificate shall descend and deed shall issue to the persons who under the laws of the Philippine Islands would have taken had the title been perfected before the death of the holder of the certificate, upon proof of the holders thus entitled of compliance with all the requirements of the certificate. In case the holder of the certificate shall have sold his interest in the land before having complied with all the conditions thereof, the purchaser from the holder of the certificate shall be entitled to all the rights of the holder of the certificate upon presenting his assignment to the Chief of the Bureau of Public Lands for registration.

SEC. 17. In the event that any lessee or purchaser of land under the provisions of this Act should fail to pay his rent or any installment of purchase money and interest thereon, or accrued interest on any installment not due, when and as the same matures, it shall be the duty of the Chief of the Bureau of Public Lands at once to protect the Government from loss. In the case of a lease, when the lessee is delinquent in payment of rent, the Chief of the Bureau of Public Lands is empowered to declare the lease forfeited, making proper entry to that effect in the books of his office and giving notice thereof to the tenant, and to enter upon and take possession of the land held by the lessee and bring suit against the lessee for all rent due; in the case of a delinquent purchaser, the Chief of the Bureau of Public Lands may enforce payment of any past-due installment and interest by bringing suit to recover the same with interest thereon, and also to enforce the lien of the Government against the land by selling the same in the manner provided by Act Numbered One hundred and ninety for the foreclosure of mortgages. In the event of such sale the purchaser at such sale shall acquire a good and indefeasible title. The proceeds of sale shall be applied to the payment of the costs of court and of all installments due or to become due on such land. If the proceeds of the sale are sufficient to pay all delinquent installments as well as all future installments

and all costs of the litigation, there shall be no further claim or liability against the original purchaser. If the proceeds of the sale of said lands should amount to more than sufficient to pay all purchase money and interest due the Government and costs of suit, the surplus thereof shall be returned to the original purchaser, or to the person entitled thereto.

SEC. 18. No lease or sale made by the Chief of the Bureau of Public Lands under the provisions of this Act shall be valid until approved by the Secretary of the Interior.

SEC. 19. No purchaser or lessee under this Act shall acquire any exclusive rights to any canal, ditch, reservoir, or other irrigation works, or to any water supply upon which such irrigation works are or may be dependent, but all of such irrigation works and water supplies shall remain under the exclusive control of the Government of the Philippine Islands and be administered under the direction of the Chief of the Bureau of Public Lands for the common benefit of those interests dependent upon them. And the Government reserves as a part of the contract of sale in each instance the right to levy an equitable contribution or tax for the maintenance of such irrigation works, the assessment of which shall be based upon the amount of benefits received, and each purchaser under this Act, by accepting the certificate of sale or deed herein provided to be given, shall be held to assent thereto. And it is further provided that all lands leased or conveyed under this Act shall remain subject to the right of way of such irrigation canals, ditches, and reservoirs as now exist or as the Government may hereafter see fit to construct.

SEC. 20. All persons receiving title to lands under the provisions of this Act shall hold such lands subject to the same public servitudes as existed upon lands owned by private persons under the sovereignty of Spain, including those with reference to the littoral of the sea and the banks of navigable rivers and rivers upon which rafting may be done.

SEC. 21. The Civil Governor, when authorized by resolution of the Commission, may, by proclamation, designate any tract or tracts of said lands as non-alienable, and reserve the same for public use, and thereafter such tracts shall not be subject to sale, lease, or other disposition under this Act.

SEC. 22. It shall be the duty of the Chief of the Bureau of Public Lands to make quarterly reports, through the Secretary of the Interior, to the Commission showing the lands leased or sold by him in accordance with the provisions of this Act, the amounts of money derived from such rentals and sales, and such other information as in his opinion may be of value to the Commission in connection with the said lands and their administration and disposition as provided by this Act. Both the Secretary of the Interior and the Chief of the Bureau of Public Lands shall have the right to require of the special counsel named in the first section hereof, or of their successors, such advice and assistance as from time to time may be required by them in the performance of their duties under this Act, and it shall be the duty of said counselors to give such legal advice and assistance.

SEC. 23. All moneys derived by the Chief of the Bureau of Public Lands from the leasing or sale of said lands, or from interest on deferred payments thereon, shall by him be promptly deposited in the Insular Treasury. Such moneys shall be by the Treasurer held separate and apart from general insular funds and shall constitute a trust fund for the payment of the principal and interest of the seven million two hundred and thirty-seven thousand dollars of bonds, issued and sold by the Secretary of War in the name and on behalf of the Government of the Philippine Islands for the purpose of raising money to pay the purchase price of said lands as provided in Act Numbered Ten hundred and thirty-four, entitled "An Act providing for the issue of bonds of the Government of the Philippine Islands to the amount of seven million two hundred and thirty-seven thousand dollars, gold coin of the United States of the present standard value, for the purpose of acquiring funds for the payment of the purchase price of certain large tracts of land in the Philippine Islands, commonly known as the friar lands, pursuant to the provisions of sections sixty-three, sixty-four, and sixty-five of the Act of Congress entitled 'An Act temporarily to provide for the administration of the affairs of civil government in the Philippine Islands, and for other purposes,' approved July first, nineteen hundred and two." Said money shall also constitute a sinking fund for the payment of said bonds at maturity and may be invested and reinvested in safe interest-bearing bonds or other securities, which shall likewise be held by the Treasurer as a part of such sinking fund, and all interest, dividends, or profits derived from said bonds or other securities thus purchased shall likewise be a part of such sinking fund and

may in turn be invested and reinvested in bonds or other securities. All purchases of bonds or other securities by the Treasurer shall be subject to the approval of the Secretary of Finance and Justice.

SEC. 24. The Chief of the Bureau of Public Lands, under the supervision of the Secretary of the Interior, shall prepare and issue such forms and instructions, consistent with this Act, as may be necessary and proper to carry into effect all the provisions hereof that are to be administered by or under the direction of the Bureau of Public Lands, and for the conduct of all proceedings arising under such provisions.

SEC. 25. The sum of ten thousand pesos, Philippine currency, is hereby appropriated, out of any funds in the Insular Treasury not otherwise appropriated, for the purpose of paying the salary of the special counsel referred to in the first section hereof and for making the investigations and surveys required hereby and for the general carrying out of the provisions of this Act.

SEC. 26. The short title of this Act shall be "The Friar Lands Act."

SEC. 27. The public good requiring the speedy enactment of this bill, the passage of the same is hereby expedited in accordance with section two of "An Act prescribing the order of procedure by the Commission in the enactment of laws," passed September twenty-sixth, nineteen hundred.

SEC. 28. This Act shall take effect on its passage.

Enacted, April 26, 1904.

Friar Lands Loan Fund.

[No. 1736.]

AN ACT Appropriating the sum of one hundred thousand pesos, for the purpose of establishing a reimbursable fund for the promotion of agricultural pursuits upon certain haciendas and parcels of land, commonly known as "Friar lands," and for the extension of the cultivated area thereof.

By authority of the United States, be it enacted by the Philippine Commission, that:

SECTION 1. There is hereby appropriated out of any funds in the Insular Treasury not otherwise appropriated, the sum of one hundred thousand pesos, for the purpose of establishing a reimbursable fund, under the direction and control of the Director of Lands except as hereinafter provided, which shall be known as the Friar Lands Loan Fund, and which shall be made available in accordance with the provisions hereinafter specified, for the making of mortgage loans upon growing crops and salable commodities manufactured therefrom, work animals, warehouses, mill houses and machinery, and other property both real and personal belonging to actual and bona fide cultivators of the so-called Friar Estates, for the encouragement of agricultural pursuits and the extension of the cultivated areas of the said estates.

SEC. 2. The Secretary of the Interior shall designate to the Director of Lands the maximum amount of the Friar Lands Loan Fund which may be loaned in accordance with the provisions of this Act within any given period of time, the rate of interest which such loans shall bear, the term within which the mortgages shall be redeemed, the estate or estates to which the provisions of this Act shall be extended, the kind or kinds of crops or salable commodities manufactured therefrom and the class or classes of buildings, animals or other property, both real and personal, which may become subject to mortgage as herein provided, the manner in which advances of loans shall be made and the maximum amount which shall be advanced for each hectare under cultivation: *Provided, however,* That in no case shall the maximum amount so advanced exceed one hundred pesos for each hectare cultivated by the mortgagor.

SEC. 3. The Director of Lands shall, under the direction and approval of the Secretary of the Interior, promulgate such regulations and issue such forms and instructions as may become necessary to secure the Government against loss and to carry out the purposes of this Act. He shall likewise cause to be kept a full and complete record of all transactions regarding loans and payments thereof, and shall keep such books and render such accounts approved by the Insular Auditor as may be necessary for the proper accounting for said fund, and loans made therefrom, together with interest on such loans.

SEC. 4. By and with the approval of the Secretary of the Interior the Director of Lands is hereby empowered, for and on behalf of the Government of the Philippine Islands, to make such loans as are authorized by this Act, and to execute as mortgagee, acting for and on behalf of the Government of the Philippine Islands, the necessary mortgages to carry out the purposes of this Act, and all mortgages executed under this Act shall be executed to the Director of Lands, mortgagee, acting for and on behalf of the Government of the Philippine Islands.

SEC. 5. For the purposes of this Act the Director of Lands shall be the trustee for all mortgagors for the purpose of disbursing amounts advanced in consideration of the mortgages, and shall have custody of all mortgages and other securities for the mortgage debts pending their final satisfaction and release. He shall approve or disapprove all applications for loans, either wholly or in part, and such approval or disapproval shall be final and conclusive: *Provided, however,* That the Secretary of the Interior shall endorse upon each mortgage his approval thereof, before said mortgage shall be considered as valid and effective.

SEC. 6. In case the mortgagors have failed or neglected to discharge the mortgages in accordance with the agreement therein specified, the Director of Lands shall, upon the maturity of the mortgage notes, proceed to the foreclosure of the mortgages in the manner provided by law. Whenever, in his opinion, the interests of the Insular Government are in jeopardy through the failure or neglect of the mortgagors properly to observe the conditions of the mortgage agreements, the Director of Lands shall likewise proceed to the foreclosure of all mortgages, or shall take such other action as may to him seem necessary in the premises.

SEC. 7. The actual and necessary expenses arising from the administration of the Friar Lands Loan Fund shall be advanced from the general appropriations made for the Bureau of Lands, and shall be reimbursed thereto from the interest and profits realized from the mortgage loans which may be made in accordance with the provisions of this Act.

SEC. 8. Upon the repayment and satisfaction of all mortgage debts the principal of the loans shall be reimbursed to the Friar Lands Loan Fund as established by section one of this Act, and all net profits from said loans shall likewise accrue to and become a part of said fund, and may be available for any or all of the purposes for which said fund may be used.

SEC. 9. The public good requiring the speedy enactment of this bill, the passage of the same is hereby expedited in accordance with section two of "An Act prescribing the order of procedure by the Commission in the enactment of laws," passed September twenty-sixth, nineteen hundred.

SEC. 10. This Act shall take effect on its passage.

Enacted, October 2, 1907.

BUREAU OF LANDS.

(Pamphlet containing)

MINING LAWS OF THE PHILIPPINE ISLANDS.

Being the provisions of the Act of Congress approved July 1, 1902, as amended by Section 9 of the Act of Congress approved February 6, 1905; also Act No. 624 of the Philippine Commission, as amended by Acts Nos. 777, 859, 1134, and 1399 of the Philippine Commission; and Act No. 1128 of the Philippine Commission, issued February 1, 1906.

Provisions contained in Act of Congress approved July 1, 1902, as amended by Section 9 of the Act of Congress approved February 6, 1905.

MINERAL LANDS.

Sections 20 to 62 inclusive (see pages 452-460).

Acts of Philippine Commission.

[No. 624.]

An Act Prescribing regulations governing the location and manner of recording mining claims, and the amount of work necessary to hold possession of a mining claim, under the provisions of the Act of Congress Approved July first, Nineteen hundred and two, entitled "An Act Temporarily to provide for the administration of the affairs of Civil Government in the Philippine Islands, and for other purposes."

By authority of the United States, be it enacted by the Philippine Commission, that:

SECTION 1. The term *mineral claim* as used in these regulations shall be understood to mean *lode claim*, and the term *mining claim* shall be understood to include both *lode* and *placer* claims. A placer claim shall be understood to mean a claim of land more valuable for placer mining, stone quarrying, or for the securing of earth for use in tile, brick, pottery, paint, or other manufacture, or of petroleum, guano, or other mineral product, than for other purposes. The rules and regulations for the securing of claims so defined as placer claims shall be as for placer claims as mentioned in this Act.

SEC. 2. Until other officers may be designated by the Government of the Philippine Islands as mining recorders, the provincial secretaries shall act as such in their respective provinces. In provinces or districts where civil government has not been established such military officers as may be designated for that purpose by the commanding general, Division of the Philippines, shall act as mining recorders.

SEC. 3. (*As amended by Acts Nos. 777 and 1134.*) All declarations and affidavits regarding mining claims, and all other documents and instruments in writing, of whatever character or nature, alienating, mortgaging, leasing, or otherwise affecting the possession of mining claims or any right or title thereto or interest therein, shall be recorded in the order in which they are filed for record, and from and after such filing for record all declarations and affidavits regarding mining claims, and all documents and instruments in writing, of whatever kind or nature, alienating, mortgaging, leasing, or otherwise affecting the possession of mining claims or any right or title thereto or interest therein shall constitute notice to all persons and to the whole world of the contents of said declarations, affidavits, documents, and written instruments and of the legal effect thereof, and under no circumstances shall any departure be made from that course.

The form of declaration of location of a mineral claim shall be as follows:

DECLARATION OF LOCATION.

The undersigned hereby declares and gives notice that, having complied with the provisions of the act of Congress approved July 1, 1902, relative to the location of mining claims, he has located ----- linear feet on a lode of mineral-bearing rock, situate in the barrio of -----, within the jurisdictional limits of the municipality of -----, Province of -----, district of -----, island of -----, P. I.

That the name of the above location is the ----- mineral claim, and that the same was located by him on the ----- day of -----, A. D. 190 .

That there is written on post No. 1 (here insert an exact copy of what is inscribed on post No. 1); and upon post No. 2 (here insert an exact copy of what is inscribed on post No. 2).

That the said claim is situate (here state as accurately as possible, preferably by course and distance, the position of the claim with reference to some natural object or permanent monument).

-----,
Locator.

Witness:

Witness:

SEC. 4. The mining recorder shall note on each instrument filed for record the year, month, and day, and the hour and minute of the day on which the same was so filed, and after it has been recorded he shall endorse on the back thereof a certificate in the following form:

OFFICE OF THE MINING RECORDER.

{DISTRICT OF}
{PROVINCE OF}

-----, 190--

The within instrument was filed for record in this office at ----- o'clock and ----- minutes ----- m., on the ----- day of -----, A. D. 190--, and has been recorded in book ----- of Records of Mining Claims, at page -----.

-----,
Mining Recorder.

SEC. 5. (*As amended by Acts Nos. 859 and 1399.*) There shall be paid to the provincial treasurer, or in the Moro Province to the district treasurer of the proper district, a fee of two Philippine pesos for each declaration of location of a mining claim and for each affidavit accompanying such declaration, and for each document or instrument in writing, of whatever character or nature, alienating, mortgaging, leasing, or otherwise affecting the possession of mining claims or any right or title thereto or interest therein, filed for record, and on the presentation of the receipt of the provincial or district treasurer the said declaration, affidavit, or other document or instrument in writing shall be recorded by the mining recorder, provided all requirements of the law before recording shall have been complied with. These fees shall be accounted for as other collections of the officers receiving them, and deposited for the credit of the proper province or district, in accordance with section six of Act Numbered Six hundred and twenty-four.

SEC. 6. The fees collected by authority of the preceding section shall be turned into the treasury of the province in which the mining claim for the recording of which said fees may be paid is situate, or in provinces or districts where civil government has not been established into the office of the Collector of Internal Revenue.

SEC. 7. The books necessary for the recording of mining claims shall be provided by the provincial authorities of the respective provinces, or in provinces or districts where civil government has not been established, by the Chief of the Bureau of Public Lands.

SEC. 8. In addition to the requirements of sections twenty-three and twenty-four of the Act of Congress approved July first, nineteen hundred and two, in

regard to placing posts numbers one and two on the line of location, and marking the line between them, each locator of a mineral claim shall establish each of the four corners of the claim by marking a standing tree or rock in place, or by setting in the ground, where practicable, a post or stone. Each corner shall be distinctly marked to indicate that it is the northeast, southeast, southwest, or other corner, as the case may be, of the claim in question; and the posts or stones used to mark such corners shall be of the dimensions required by these regulations for posts and stones marking corners or angles of a placer claim.

SEC. 9. The locator of a placer claim shall post upon the same a notice containing the name of the claim, designating it as a placer claim, the name of each locator, the date of the location, and the number of hectares claimed. He shall also define the boundaries of the claim by marking a standing tree or rock in place, or by setting a post or stone at each corner or angle of the claim. When a post is used it must be at least five inches in diameter or four inches on each side by four feet six inches in length, and, where practicable, set one foot in the ground and surrounded by a mound of earth or stone four feet in diameter by two feet in height. When a stone, not a rock in place, is used, it must be not less than six inches on each side by two and one-half feet in length, and must be set so as to project half its length above the ground. Where a stone, a rock in place, is used, a cross must be cut in the stone, the arms of which cross must be at least four inches long, intersecting, approximately, at right angles and in their centers, the cutting to be at least one-half inch deep. The intersection of the arms shall constitute the corner. Each tree, rock in place, stake, or stone used to designate a corner or angle of a placer claim must be so marked as to clearly indicate its purpose, and the objects selected to designate the corners of a claim shall be marked with a series of consecutive numbers, thus: "Cor. No. 1," "Cor. No. 2," "Cor. No. 3," and so forth: *Provided*, That nothing in this section shall be understood to require the establishment and marking of any corner or angle of a placer claim located upon surveyed public lands at a point where a corner of the Philippine system of public-land surveys has previously been established, in which case it shall suffice in describing said claim for record to correctly describe said corner of the public surveys, and to state that such corner stands for corner number one, corner number two, or corner number three, and so forth, as the case may be, of such placer claim.

SEC. 10. Within thirty days after the location thereof every locator of a placer claim shall record the same with the mining recorder of the province or district in which the claim is situate.

SEC. 11. The record of a placer claim shall consist of a declaration of location reciting all the facts necessary to a perfect identification of the claim, and shall contain a true copy of the notice posted thereon at the date of location, as well as a description of the claim as staked and monumented, showing the length and approximate compass bearing, as near as may be, of each side or course thereof, and stating in what manner the respective corners are marked, whether by a standing tree, rock in place, post, or stone, and giving in detail the distinguishing marks that are written or cut on each, and also stating as accurately as possible, preferably by course and distance, the position of the claim with reference to some prominent natural object or permanent monument.

SEC. 12. No placer claim shall be recorded unless the declaration of location be accompanied by an affidavit made by the applicant or some person on his behalf cognizant of the facts, that the notice required by section nine of these regulations has been posted upon the claim, and that the ground thereby embraced is valuable for placer mining purposes; that the ground applied for is unoccupied by any other person.

SEC. 13. No mining claim shall be recorded unless the declaration be accompanied by proof that the locator, or each of them in case there be no more than one, is a citizen of the United States of America or of the Philippine Islands. The proof of citizenship required by this section may be that set forth in section thirty-five of the Act of Congress approved July first, nineteen hundred and two.

SEC. 14. If at any time the locator of any mining claim heretofore or hereafter located, or his assigns, shall apprehend that his original notice or declaration was defective, erroneous, or that the requirements of the law had not been complied with before recording, or shall be desirous of changing his boundaries so as to include ground not embraced by the location as originally made and recorded, or in case the original declaration of location was made prior to the promulgation of these regulations, and the locator or his assigns shall desire to

conform the location and declaration hereto, such locator or his assigns may file an amended declaration of location in accordance with the provisions of the Act of Congress of July first, nineteen hundred and two, and these regulations, with the mining recorder of the province or district in which such claim is situate: *Provided*, That such amended declaration of location does not interfere at the date of its filing for record with the existing rights of any person or persons, and no such amended location or the record thereof shall preclude the locator or his assigns from proving any such title as he or they may have held under the original location.

SEC. 15. Within sixty days after the expiration of the period fixed by law for the annual performance of the labor or the making of improvements upon a mining claim, the locator thereof, or some person on his behalf cognizant of the facts, shall make and file for record with the mining recorder of the province or district in which the claim is situate an affidavit in substance as follows:

AFFIDAVIT OF ANNUAL ASSESSMENT WORK.

PHILIPPINE ISLANDS.

Province of }
District of }-----

-----, being first duly sworn, deposes and says that he is a citizen of the United States of America (or of the Philippine Islands, as the case may be) and more than twenty-one years of age; that he resides in -----
province of }
district of }-----, P. I., and is personally acquainted with the mining claim known as the ----- (lode or placer) claim, situate in the barrio of -----, Province of -----, island of -----, P. I., the declaration of location of which is recorded in the office of the mining recorder of said province (or district), in book ----- of Record of Mining Claims, at page -----; that between the ----- day of -----, 190 , and the ----- day of -----, 190 , not less than ----- dollars' worth of labor was performed or improvements made upon said claim, not including the work done prior to the date of recording the same. Such work was done or improvements made by and at the expense of -----, the owner of said claim, for the purpose of complying with the laws of the United States relating to annual assessment work, and ----- (here name the miners or other persons who did the work) were the persons employed by said owner who did such work or made such improvements, and that said work or improvements consisted of and are described as follows, to wit:

----- (here describe the work done).
(Signature)-----
Subscribed and sworn to before me this ----- day of -----, 190 .

(Signature of officer who administers oath.)

Such affidavit, when recorded, shall be prima facie evidence of the performance of such labor or the making of such improvements, and shall be received in evidence by all courts in the Philippine Islands, as shall also the record thereof or a certified copy of the same.

SEC. 16. Actual expenditures and cost of mining improvements by the claimant or his grantors, having a direct relation to the development of the claim, shall be included in the estimate of assessment work. The expenditures may be made from the surface, or in running a tunnel, drifts, or crosscuts for the development of the claim. Improvements of any other character, such as buildings, machinery, or roadways, must be excluded from the estimate unless it is clearly shown that they are associated with actual excavations, such as cuts, tunnels, shafts, and so forth, are essential to the practical development of and actually facilitate the extraction of mineral from the claim.

SEC. 17. The public good requiring the speedy enactment of this bill, the passage of the same is hereby expedited in accordance with section two of "An Act prescribing the order of procedure by the Commission in the enactment of laws," passed September twenty-sixth, nineteen hundred.

SEC. 18. This Act shall take effect on its passage.

Enacted, February 7, 1903.

[No. 1123.]

An Act Prescribing regulations governing the procedure for acquiring title to public coal lands in the Philippine Islands, under the provisions of sections fifty-three, fifty-four, fifty-five, fifty-six, and fifty-seven of the Act of Congress approved July first, nineteen hundred and two, entitled "An Act temporarily to provide for the administration of the affairs of civil government in the Philippine Islands, and for other purposes."

By authority of the United States, be it enacted by the Philippine Commission, that:

SECTION 1. Any person above the age of twenty-one years, who is a citizen of the United States or of the Philippine Islands, or who has acquired the rights of a native of said Islands under and by virtue of the Treaty of Paris, or any association of persons severally qualified as above, may purchase any unreserved, unappropriated public land which is chiefly valuable for coal by proceeding as hereinafter directed: *Provided*, That no individual person shall be entitled to purchase more than sixty-four hectares and no association more than one hundred and twenty-eight hectares: *And provided further*, That this Act shall be held to authorize but one entry by the same person or association of persons, and no association of persons, any member of which shall have taken the benefit of this Act, either as an individual or as a member of any other association, shall enter or hold any other lands under the provisions hereof, and no member of any association which shall have taken the benefit of this Act shall enter or hold any other lands under the provisions hereof: *And provided further*, That such lands, if previously surveyed by the Government, shall be taken by legal subdivisions, but if unsurveyed shall be taken, wherever possible, in the form of squares which shall contain at least sixteen hectares each.

SEC. 2. A coal claim may be initiated either by filing a declaration of location with the mining recorder of the province in which the land is located, or by actually taking possession of the land and making improvements thereon: *Provided, however*, That where claims are initiated by occupation, a proper declaration of location must be filed with the mining recorder within sixty days after the date of actual possession and commencement of improvements.

SEC. 3. The declaration of location above mentioned must be executed under oath, and must describe the land occupied in as definite a manner as practicable, and must contain all necessary allegations to show that applicant has the qualifications required under section one of this Act, and that the land is of the character therein mentioned. In case a right to purchase is based on prior occupation and improvement, that fact must be set out, and the date of occupation and amount of improvements stated.

SEC. 4. It shall be the duty of the mining recorder to record declarations of locations of coal claims in the same manner that declarations of locations of mining claims are recorded; and for such services he shall require the payment of a fee of two pesos, Philippine currency, which shall be paid to the provincial or district treasurer as provided in section five of Act Numbered Six hundred and twenty-four as amended by Act Numbered Eight hundred and fifty-nine.

SEC. 5. All declarations of locations shall be recorded in the order in which they are filed for record, and the mining recorder shall note on each instrument filed for record the year, month, and day, and the hour and minute of the day on which the same was filed. After recording the declaration, the mining recorder shall make a true copy of the same and without delay forward it to the Chief of the Bureau of Public Lands.

SEC. 6. All persons seeking to acquire public lands under the provisions of this Act must prove their respective rights and pay for the land filed upon within one year from the time prescribed for filing their claims, and they shall not take from the land and sell any coal prior to obtaining a patent.

SEC. 7. A patent for land claimed and located for valuable coal deposits may be obtained in the following manner: Any person or association authorized to locate a coal claim under this Act having claimed and located a piece of land for such purposes, who or which has complied with the terms of this Act, shall file with the Chief of the Bureau of Public Lands an application for a patent, under oath, showing such compliance, together with a plat and field notes of the claim made by or under the direction of the Chief of the Bureau of Public Lands, and at applicant's expense, showing accurately the boundaries of the claim, which shall be distinctly marked by monuments on the ground, and shall

post a copy of such plat, together with a notice of such application for a patent, in a conspicuous place on the land described in such plat previous to the filing of the application for a patent, and shall file an affidavit of at least two persons that such plat and notice have been duly posted. Upon the filing of said application, plat, field notes, notices, and affidavits it shall be the duty of the Chief of the Bureau of Public Lands to publish once a week a notice that such application has been made, for the period of nine consecutive weeks, in a newspaper to be by him designated; also to post a copy of the application in his office, and to require such further publication as he, with the approval of the Secretary of the Interior, may deem advisable. At the expiration of the period of publication the claimant shall file his affidavit, showing that the plat and notice have been posted in a conspicuous place on the claim during such period of publication. If no adverse claim shall have been filed in the Bureau of Public Lands during the said period of publication, it shall be assumed that the applicant is entitled to a patent, upon payment to the Chief of the Bureau of Public Lands of fifty pesos per hectare where the land shall be situated more than fifteen miles from any completed railroad, available harbor, or navigable stream, and one hundred pesos per hectare for such lands as shall be within fifteen miles of such road, harbor, or stream, and that no adverse claim exists: *Provided*, That where the claimant for a patent is not a resident of or within the province wherein the land sought to be purchased is located, the application for patent and the affidavits required to be made in this section by the claimant for such patent may be made by his, her, or its authorized agent, where said agent is conversant with the facts sought to be established by said affidavits.

Sec. 8. Where an adverse claim is filed during the period of publication, it shall be upon oath of the person or persons making the same, and shall show the nature, boundaries, and extent of such adverse claim, and all proceedings, except the publication of notice and making and filing of the affidavit thereof, shall be stayed until the controversy shall have been settled or decided by a court of competent jurisdiction, or the adverse claim waived. It shall be the duty of the adverse claimant, within thirty days after filing his claim, to commence proceedings in a court of competent jurisdiction to determine the question of the right of possession, and prosecute the same with reasonable diligence to final judgment, and a failure so to do shall be a waiver of his adverse claim. After such judgment shall have been rendered, the party entitled to the possession of the claim, or any portion thereof, may, without giving further notice, file a certified copy of the judgment roll with the Chief of the Bureau of Public Lands, who, in case the conditions of section seven of this Act have been complied with, shall issue to the claimant a patent for such land as by the decision of the court he appears to be entitled to.

Sec. 9. All patents for lands disposed of under this Act shall be prepared in the Bureau of Public Lands and shall issue in the name of the United States and the Philippine Government under the signature of the Civil Governor; but such patents shall be effective only for the purposes defined in section one hundred and twenty-two of the Land Registration Act, and the actual conveyance of the land shall be effected only as provided in said section.

Sec. 10. The Chief of the Bureau of Public Lands, under the supervision of the Secretary of the Interior, shall prepare and issue such forms and instructions consistent with this Act as may be necessary and proper to carry its provisions into effect, and for the conduct of all proceedings arising hereunder.

Sec. 11. The public good requiring the speedy enactment of this bill, the passage of the same is hereby expedited in accordance with section two of "An Act prescribing the order of procedure by the Commission in the enactment of laws," passed September twenty-six, nineteen hundred.

Sec. 12. This Act shall take effect on its passage.

Enacted, April 23, 1904.

BUREAU OF PUBLIC LANDS.

(Circular.)

COAL LAND LAW AND INSTRUCTIONS AND FORMS PERTAINING TO THE SAME, AUG. 22, 1904.

Laws.

Act No. 1128, Philippine Commission, an Act relating to the sale of public coal lands in the Philippine Islands, together with instructions and forms pertaining to same, are hereby published for the guidance of public officials in the administration of the law and for the information of the public.

[No. 1128]

An Act Prescribing regulations governing the procedure for acquiring title to public coal lands in the Philippine Islands, under the provisions of sections fifty-three, fifty-four, fifty-five, fifty-six, and fifty-seven of the Act of Congress approved July first, nineteen hundred and two, entitled "An Act Temporarily to provide for the administration of the affairs of civil government in the Philippine Islands, and for other purposes."

(See pages 497-498.)

Instructions and forms.

Under the authority conferred by section 10, *supra*, the following instructions and forms are issued:

1. **Land which may be purchased.**—Any unclaimed public land containing valuable deposits of coal is subject to sale under the provisions of this Act. Prospective purchasers will be required to show by affidavit that the land sought to be purchased contains such valuable deposits.

2. **Who may purchase.**—The following-described persons are entitled under the law to purchase public coal land:

(a) Citizens of the United States over the age of twenty-one years.

(b) Natives of the Philippine Islands or persons who have acquired the rights of natives by virtue of the treaty of Paris of December tenth, eighteen hundred and ninety-eight, and who are over the age of twenty-one years.

(c) Associations of persons the members of which are severally qualified as above.

3. **Amount that may be purchased.**—An individual may purchase any amount not exceeding sixty-four hectares. An association is limited to one hundred and twenty-eight hectares. A purchaser is entitled to make but *one* purchase of the maximum amount allowed.

4. **Form in which land must be taken.**—Where the land sought to be purchased has been previously surveyed under a regular governmental system of surveys dividing the territory into subdivisions, purchase must be made by such subdivisions. But where the land is unsurveyed, it must be taken when possible in squares which shall contain not less than sixteen hectares, but may contain any quantity in excess of sixteen hectares to the amount the purchaser is entitled to purchase.

5. **Manner of locating a coal claim.**—Any person qualified to purchase public coal land may initiate a claim to any particular tract by taking possession of

same and within sixty days thereafter filing a declaration of location thereof with the secretary of the province in which the land is located. This declaration of location must be executed under oath and must give as definite a description of the land as it is possible to state without making a survey. (*Form No. 1 should be used.*)

In locating a claim locators should exercise great care in marking the corners of same, and should describe the corners with reference to some prominent natural object or landmark—as a tree or rock on the claim—that is, give the approximate direction and distance of each corner from said landmark. Declarations of location of coal claims are recorded in the same manner as like notices for other mining claims, and the same fees are charged. (See Act No. 624.)

The mining recorder will as soon as possible after recording a declaration of location of a coal claim forward a copy of same to the Chief of the Bureau of Public Lands.

6. Manner of acquiring title.—An application to purchase coal land must be filed with the Chief of the Bureau of Public Lands within one year from the date of filing a declaration of location therefor with the mining recorder.

The first step in the procedure for acquiring title is the filing with the Chief of the Bureau of Public Lands of an application for survey of the land. (*Form No. 2 should be used in making this application.*) The survey is made under the directions of the Chief of the Bureau of Public Lands, at applicant's expense. The Government will take no action on an application for survey until the estimated cost of making same is deposited with the Chief of the Bureau of Public Lands.

After a claim has been properly surveyed and claimant has received a plat thereof and the field notes of survey, he should file his application for a patent (*using form No. 3*), together with a copy of the plat and field notes of survey, with the Chief of the Bureau of Public Lands. On the same date as that of his application for a patent claimant should post in a conspicuous place on the claim a notice of his application for a patent (*using form No. 4*), together with a copy of the plat of the claim, and should forward to the Chief of the Bureau of Public Lands an affidavit executed by two disinterested persons showing that said notice and plat have been posted. (*Form No. 5 should be used in executing this affidavit.*)

At the expiration of nine weeks from the date of posting said notice and plat, the applicant will file another affidavit with the Chief of the Bureau of Public Lands showing that said notice and plat have been posted on the claim for a period of nine weeks. (*Form No. 6 should be used in executing this affidavit.*)

Where the claimant for a patent is not a resident of or within the province wherein the land sought to be purchased is located, the application for patent and the affidavits required to be made by the claimant for such patent may be made by his, her, or its authorized agent, where said agent is conversant with the facts sought to be established by said affidavits.

The Chief of the Bureau of Public Lands will cause a notice to be published in the newspapers in which official notices are published, calling attention to each application for a patent, and will cause a like notice to be posted in the office of the secretary of the province in which the land is located. Said notices will be published for a period of nine weeks.

7. Value of coal lands.—The price per hectare is fifty pesos, Philippine currency, where the land is situated *more* than fifteen miles from any completed railroad, available harbor, or navigable stream, and one hundred pesos, Philippine currency, per hectare where the land is within fifteen miles of such railroad, harbor, or stream. Purchasers will be required to deposit the purchase price with the Chief of the Bureau of Public Lands at the time of filing the application to purchase.

8. Adverse claims.—Any person claiming an interest in land adverse to the interest sought to be acquired by an applicant for a patent thereto, must file a notice of such claim with the Chief of the Bureau of Public Lands prior to the expiration of the period of publication of the notice of application for patent above mentioned. And such person must, furthermore, within thirty days after filing said notice with the Chief of the Bureau of Public Lands, commence proceedings in a court of competent jurisdiction to determine the question of the right of possession, and prosecute the same with reasonable diligence to final judgment; and a failure so to do will constitute a waiver of said adverse claim. (See sec. 8, Act No. 1128.)

9. **Prospecting.**—The land may be thoroughly prospected and coal necessary for tests may be removed for that purpose, but none may be sold or used commercially prior to issuance of patent.

10. **Timber.**—A gratuitous license to cut and use timber for mining purposes may be had on application to the Bureau of Forestry. Said license will be limited to the claim on which the timber is cut. (See sec. 17, Act No. 1148.)

Manila, P. I., June 10, 1904.

P. S. BLACK,
Acting Chief Bureau of Public Lands.

Approved August 22, 1904:

DEAN C. WORCESTER, *Secretary of the Interior.*

Forms for use in proceedings to acquire title to public coal lands.

FORM No. 1.

Declaration of location of coal claim.

The undersigned hereby declares and gives notice that under the provisions of Act No. 1128, Philippine Commission, _____ has located a coal claim in the barrio of _____, municipality of _____, Province of _____, the boundaries of which are more particularly described as follows, to wit: (Here give as definite a description as possible of the boundaries of the claim, having reference to monuments erected on the ground.) and _____ further declares that _____ is over the age of twenty-one years and is a citizen of the United States (or of the Philippine Islands) and has never held nor purchased any land under the provisions of said Act, either as an individual or as a member of an association; that said land is unoccupied by any other person, and contains valuable deposits of coal, and that _____ took possession of the same on the __ day of _____, A. D. 19__, and has made improvements consisting of _____

(Signed) _____,

_____,
Locator.
(Post-office) _____

Subscribed and sworn to before me this __ day of _____, 19__.

(Signature of official) _____

(Official title.)

NOTICE.—Where a claim is located by an association, it will be necessary for the locator to show that the several members of the association are each qualified to make a location.

FORM No. 2

Application for survey of coal claim.

_____, 19__.

To the CHIEF OF THE BUREAU OF PUBLIC LANDS,

Manila, P. I.

SIR: In compliance with section 7, Act No. 1128, Philippine Commission, I hereby make application for an official survey of a coal claim located by _____ in the barrio of _____, municipality of _____, Province of _____, and request that you will send me an estimate of the amount to be deposited in payment therefor, and after such deposit shall have been made, you will cause the said claim to be surveyed.

Respectfully,

FORM No. 3.

Application for patent for coal land.

To the CHIEF OF THE BUREAU OF PUBLIC LANDS,
Manila, P. I.

SIR: I _____, hereby apply, under the provisions of Act No. 1128, Philippine Commission, an Act relating to the sale of public coal lands in the Philippine Islands, to purchase _____ hectares of coal land located in the barrio of _____, municipality of _____, Province of _____, and more particularly described as follows, to wit:

(Here give full description.)

_____ which description is set forth in the official field notes of survey of said tract hereto attached, dated _____, and the official plat of survey, a copy of which is filed herewith; there is hereby tendered _____ pesos in payment for said land; and I solemnly swear that I am over the age of twenty-one years, a citizen of the United States (or of the Philippine Islands), and have never held nor purchased lands under said Act either as an individual or as a member of an association; and I do further swear that I am well acquainted with the character of said described land, having frequently passed over same; that my knowledge of said land is such as to enable me to testify understandingly with regard thereto; that no portion of said land is in the possession or occupation of any other person, and that it contains valuable deposits of coal and is chiefly valuable therefor; that I located said land as a coal claim on the ____ day of _____, and filed my notice of location with the mining recorder of the Province of _____ on the ____ day of _____.

(Signed) _____

(Address) _____

(Date) _____

Subscribed and sworn to before me this ____ day of _____, A. D. 19____.

(Signature of official) _____

(Official title.) _____

N. B.—Where the applicant for a patent is an association, evidence must be submitted showing that the members of the same are severally qualified to purchase.

FORM No. 4.

Notice of Application for Patent for Coal Land.

Notice is hereby given that in pursuance of the provisions of Act No. 1128, Philippine Commission, _____ has located a coal claim in the barrio of _____, municipality of _____, Province of _____, and has made application for a patent for said claim, which is more fully described as to metes and bounds by the official plat herewith posted and by the field notes of survey thereof, now filed in the Bureau of Public Lands, which field notes of survey describe the boundaries and extent of said claim on the surface as follows, to wit: (Here give full description.)

Any and all persons claiming adversely the said described land, or any portion thereof, are hereby notified that unless their adverse claims are duly filed according to law within nine weeks from the date hereof with the Chief of the Bureau of Public Lands at Manila, P. I., said claims will not be considered by the Government.

(Name of claimant) _____

(Post-office) _____

Dated on the ground this ____ day of _____, A. D. 19____.

FORM No. 5

Proof of Posting Notice and Plat on Coal Claim.

PROVINCE OF _____, MUNICIPALITY OF _____
 _____ and _____
 _____, each for himself, and not one for the other, being first duly sworn according to law, deposes and says, that he is over the age of twenty-one years, and was present on the _____ day of _____, A. D., 19____, when a plat representing the _____ coal claim, and certified to as correct by the Chief of the Bureau of Public Lands, and designated by him as Coal Claim No. _____, together with a notice of the intention of _____ to apply for a patent for said claim and premises so platted, was posted in a conspicuous place upon said claim, to wit: Upon a _____, where the same could be easily seen and examined; the notice so conspicuously posted upon said claim being in words and figures as follows, to wit:

NOTICE OF APPLICATION FOR PATENT FOR COAL LAND.

Notice is hereby given that in pursuance of the provisions of Act No. 1128, Philippine Commission, _____ has located a coal claim in the barrio of _____, municipality of _____, Province of _____, and has made application for a patent for said claim, which is more fully described as to metes and bounds by the official plat herewith posted and by the field notes of survey thereof now filed in the Bureau of Public Lands, which field notes of survey describe the boundaries and extent of said claim on the surface as follows, to wit: (Here give full description.)

Any and all persons claiming adversely the said described land or any portion thereof so described, are hereby notified that unless their adverse claims are duly filed according to law within nine weeks from the date hereof with the Chief of the Bureau of Public Lands at Manila, P. I., said claim will not be considered by the Government.

(Name of claimant) _____,

(Post-office) _____

Dated on the ground this _____ day of _____, A. D., 19____.

Witness:

 (Name.)

 (Address.)

 (Name.)

 (Address.)

Subscribed and sworn to before me, this _____ day of _____, A. D., 19____.

(Signature of official) _____

(Official title.) _____

FORM No. 6.

Proof that Plat and Notice Remained Posted on Claim During Period of Publication.

_____, a resident of the town of _____, Province of _____, deposes and says that he is over the age of twenty-one years, and that he is acquainted with the coal claim of _____, particularly described as follows, to wit: _____: that the official plat of such claim, designated as such by the Chief of the Bureau of Public Lands, together with a notice of intention to apply for a

patent therefor, was posted thereon on the ----- day of -----, A. D. 19--, as fully set forth and described in the affidavit of ----- and -----, dated the ----- day of -----, A. D. 19--, which affidavit was duly filed in the Bureau of Public Lands at Manila, P. I.; and that the plat and notice so mentioned and described remained continuously and conspicuously posted upon said coal claim from the ----- day of -----, A. D. 19--, to the ----- day of -----, A. D. 19--, including the nine weeks' period during which notice of said application for patent was published in the newspaper.

Subscribed and sworn to before me this ----- day of -----, A. D. 19--.

(Signature of official) -----
(Official title.) -----

BUREAU OF PUBLIC LANDS.

CIRCULAR CONTAINING THE LAWS AND INSTRUCTIONS CONCERNING THE LEASING OF PUBLIC LANDS, ISSUED NOVEMBER 7, 1904.

DEPARTMENT OF THE INTERIOR,
BUREAU OF PUBLIC LANDS,
Manila, P. I., October 11, 1904.

The following compilation of laws and instructions relative to leasing the public lands are issued under authority of section sixty-nine of "the public land act," act No. 926, for the information of the public and the guidance of public officers engaged in the administration of the laws.

Laws.

ACT OF CONGRESS OF JULY 1, 1902.

SEC. 13. (See page 451.)

SEC. 75. (See page 461.)

ACTS OF THE PHILIPPINE COMMISSION.

[Act No. 926.]

CHAPTER III.—*Leases of portions of the public domain.*

Sections 22 and 31 inclusive (see pages 465, 467).

The civil governor was advised by the chief of the Bureau of Insular Affairs, Washington, D. C., by cablegram dated May 4, 1904, that Congress had adjourned without amending or disapproving the public land act (act No. 926). On July 26, 1904, the civil governor issued his proclamation declaring the public land act to be in full force and effect from said date, as contemplated by section 13, Act of Congress of July 1, 1902, above stated.

Instructions.

LANDS SUBJECT TO LEASE.

All unoccupied, unreserved, nonmineral public lands, more valuable for agricultural than forestry uses, are subject to lease. Public lands are such lands of the government as are subject to disposal under general laws. Mineral lands are such lands as are chiefly valuable for the minerals they contain. Whether lands upon which there is growing timber are more valuable for agricultural than for forestry uses will be determined by the forestry bureau. (See sec. 18, act of Congress of July 1, 1902.)

Owing to the system of disposing of public lands which obtained under the Spanish Government in these islands, the present government has no maps showing the exact location of public lands; therefore, prospective lessees will be compelled to make inquiries as to the ownership of any particular tract desired of persons living in the vicinity thereof, and to consult the property register and record of tax returns, in the capital of the province in which the land is located, for evidence of ownership.

No lease will be permitted to interfere with any prior claim by settlement or occupation until the consent of the occupant or settler is first had and obtained, or until such claims shall be legally extinguished.

The provisions of the public land act relating to leasing public lands do not extend, at the present time, to the provinces of Lepanto-Bontoc, Benguet, Paragua, Nueva Vizcaya, and the Moro Province, but may at any time, by resolution of the Philippine Commission, be extended to said provinces.⁴

PERSONS WHO MAY LEASE PUBLIC LANDS.

(1) Citizens of the Philippine Islands; (2) citizens of the United States; (3) citizens of any insular possession of the United States; (4) any corporation or other association of persons organized under the laws of the Philippine Islands or of the United States, or of any State, Territory, or insular possession thereof, authorized by the laws of its creation and by the laws of the Philippine Islands and the acts of Congress applicable thereto to transact business in the Philippine Islands. In this connection see section 75, act of Congress of July 1, 1902, *supra*, as to rights of corporations.

AMOUNT THAT MAY BE LEASED.

A qualified person may lease any amount not exceeding 1,024 hectares, equivalent to about 2,530 acres.

PERIOD OF LEASE.

Leases shall run for a period of not more than twenty-five years, but may be renewed for a second period of twenty-five years.

RENT.

Lessees will be required to pay an annual rent in advance, the amount of which will be fixed by the chief of the bureau of public lands, with the approval of the Secretary of the Interior, but it can in no case be less than 50 centavos, Philippine currency, per hectare, and during the second period can not exceed ₱1.50 per hectare. The first payment of rent is due on the date of the execution of the lease, and must be paid before the lease is delivered.

FORM IN WHICH LEASED LANDS MUST BE TAKEN.

Leased lands, in all cases where possible, must be taken in tracts compact in form as provided in section 23 of the public land act. Tracts to be contiguous must have one boundary in common. The purpose of this provision is to prevent the taking of land in long or irregular strips whereby adjoining public lands would be decreased in value.

PROCEDURE IN MATTER OF OBTAINING LEASE.

Prospective lessees are required to file an application for the land desired with the chief of the bureau of public lands. This application must show that the applicant is qualified to lease public lands; must describe the land desired to be leased, with respect to both its location and character, as definitely as practicable, and must be executed under oath. A proper form to be used in making application will be furnished on request by the bureau of public lands.

Applicants must give notice of intention to apply for a lease by publication for thirty days in two newspapers, one English and one Spanish. Said newspapers shall be of general circulation in the locality where the land is located. When the notice is published in a weekly newspaper, five consecutive insertions are necessary; when in a daily newspaper, the notice must appear in each issue for thirty-one consecutive issues. Said notice shall state the date when said application will be made, and shall describe as definitely as possible the land to be applied for; an approved form may be found at the close of this circular. Applicant must file a copy of the notice at the same date at which he begins the publication of same with the provincial secretary and municipal president of the province and municipality in which the land is located. In case the land is located within the city of Manila, said notice must be filed with the secretary of the municipal board.

Applicant must submit to the chief of the bureau of public lands with his application a copy of said notice, and must show by affidavit of the manager of the newspaper in which same was published that it was published for the required period.

The application will be examined in the bureau of public lands, and if found correct will be referred to the forestry bureau for report as to whether the land is more valuable for agricultural than for forestry purposes.

Upon return of the application to the bureau of public lands from the forestry bureau, with a report that the land is more valuable for agricultural than forestry uses, the chief of the bureau of public lands will, with the approval of the Secretary of the Interior, fix the rate per hectare at which the government will lease the land. He will then advise the applicant of the rate fixed, also of the probable cost of surveying the tract.

Upon deposit by applicant in the bureau of public lands of the amount of the estimated cost of survey the chief of said bureau will advise applicant of the date when he will cause the survey to be made, and will also send a copy of said notice to the secretary of the province and one to the president of the municipality in which the land is located, requesting said officials to post said notices in a conspicuous place in their respective offices.

Upon completion of the survey, in case there are no adverse claims to the land, a lease will be executed therefor as early as practicable.

MISCELLANEOUS.

A lessee of public lands has no right to remove timber except as authorized by the forestry bureau.

No minerals may be removed from public lands under a lease. In case it is made to appear that leased lands contain valuable mineral deposits, the chief of the bureau of public lands, with the approval of the Secretary of the Interior, is authorized to cancel the lease as to such lands.

Attention is invited to the fact that section 77 of the public land act prescribes a penalty for the presentation of false proof or affidavits in connection with applications or claims respecting public lands.

All necessary forms to be used in connection with the leasing of public lands may be had on application to the bureau of public lands.

WILL M. TIPTON,
Chief Bureau of Public Lands.

Approved, November 7, 1904.

DEAN C. WORCESTER,
Secretary of the Interior.

NOTICE OF APPLICATION TO LEASE PUBLIC LANDS.

The undersigned hereby gives notice that he will on the _____ day of _____, 19____, file with the chief of the bureau of public lands, Manila, P. I., an application for a lease to the following described public land, beginning _____

[Here give description as definitely as possible.]

located in the barrio of _____, municipality of _____, province of _____, and containing _____ hectares, more or less.
Signature of applicant _____
Post-office address _____

REPORT OF THE PHILIPPINE COMMISSION.

THE GOVERNMENT OF THE PHILIPPINE ISLANDS,

DEPARTMENT OF THE INTERIOR.

BUREAU OF LANDS.

FORM No. 11.

Lease Application.

(BY AN INDIVIDUAL.)

BUREAU OF LANDS No. -----

Local Land Office No. --

1. The undersigned hereby makes application under the provisions of Chapter III of The Public Land Act No. 926 to lease, for the period of ----- years, the following tract of land, viz (give as accurate a description as possible, showing boundaries of land, having reference to natural objects and permanent monuments, if any): situate in the barrio of -----, Municipality of -----, Island of -----, Province of -----, Philippine Islands, and containing an area of ----- hectares ----- ares and ----- centares; said tract being as nearly as practicable rectangular in shape and not more than 800 meters in length, as indicated by the accompanying rough sketch.

2. To show that the qualifications required by law are possessed by the applicant, the following statement of facts is submitted:

3. My name is -----; my age is ----- years; the place of my birth was -----; I am a citizen of -----; and my postoffice address is -----.

4. I have been upon and examined the land applied for, and it contains no improvements or indications of settlement or cultivation, and to the best of my knowledge, information, and belief the land is unoccupied, unreserved, unappropriated, nonmineral agricultural public land; contains no deposits of coal or salts, and is more valuable for agricultural than forestry or other purposes.

5. If I am awarded a lease of the land I will reimburse the Government the cost of survey, and I will sign and execute a contract of lease for said land containing the provisions and conditions required and provided by law and by the rules and regulations governing the leasing of agricultural public lands.

(Signature of applicant.)

AFFIDAVIT.

PHILIPPINE ISLANDS, PROVINCE OF -----

MUNICIPALITY OF -----

} ss.

6. I, -----, the person making this application, first being duly sworn, upon my oath depose and say: That I have read or have had read to me and thoroughly understand the foregoing application; that I signed said application and this affidavit in the presence of the officer who administered the oath; that each and every statement in said application is true and correct. So help me God.

7. Before me at the place aforesaid, on this ----- day of -----, 19--, personally appeared -----, personally known to me to be the person whose name appears in the foregoing application, and in my presence he signed the said application and subscribed and swore to this affidavit.

8. The affiant exhibited to me his cedula, which was No. -----, issued at ----- on the ----- day of -----, 19--, which showed him at the date of said cedula to be ----- years of age, and a native of -----

To all of which I certify.

{ Here attach a 20-
centavo docu-
mentary stamp. }

(Officer authorized to administer oaths.)

(Official title.)

SPACE FOR SKETCH MAP.

(The services of a surveyor or expert draftsman are not required.)

BUREAU OF LANDS.

SALES CIRCULAR

Containing

Chapter II of the Public Land Act, providing for sales of portions of the public domain, and instructions and forms pertaining thereto,
Issued November 23, 1905.

LETTER OF TRANSMITTAL.

DEPARTMENT OF THE INTERIOR,
BUREAU OF PUBLIC LANDS,
Manila, October 18, 1905.

SIR: I have the honor to submit herewith for your consideration and approval, if found satisfactory, instructions governing the sale of public lands, as provided in Chapter II, Act No. 926, Philippine Commission, issued in compliance with the requirements of section 69 of said act. A copy of said Chapter II, with a copy of section 75, act of Congress approved July 1, 1902 (32 U. S. Stat., 691), and a copy of Act No. 1404, providing that provincial treasurers shall act as local land officers, and copies of the forms to be used in connection with the purchase of lands under this chapter, are attached hereto.

Very respectfully,

J. W. ANDERSON,
Acting Chief, Bureau of Public Lands.

The Honorable SECRETARY OF THE INTERIOR, *Manila.*

Approved, November 23, 1905:

DEAN C. WORCESTER, *Secretary of the Interior.*

Instructions relative to the sale of Public Lands.

The following instructions, under Chapter II of the Public Land Act (No. 926), providing for the sale of public lands, are promulgated, under section 60 of said act, for the information of those concerned. As a supplement hereto will be found a copy of Chapter II of said act, with section 75 of the act of Congress approved July 1, 1902 (32 U. S. Stat., 691), and a copy of Act No. 1404, providing that provincial treasurers shall act as local land officers, and copies of the forms to be used in the purchase of lands under said chapter:

(1) Land which may be purchased and by whom.—Unoccupied, unappropriated, and unreserved nonmineral agricultural public land may be purchased by individuals, by copartnerships, and by corporations and like associations. An individual, in order to be qualified to purchase, must be a citizen of the Philippine Islands or of the United States or of some of the insular possessions of the United States. A copartnership, in order to be qualified to purchase, must be composed exclusively of individuals having citizenship. A corporation or like association must be organized under and according to the laws of the Philippine Islands or of the United States or some State, Territory, or insular possession of the United States.

(2) **Area which may be purchased.**—An individual may purchase not more than sixteen hectares of land. A copartnership may not purchase a greater quantity of land than sixteen hectares for each partner. A corporation or like association may purchase not more than one thousand and twenty-four hectares.

(3) **Relative to corporations.**—Every corporation authorized to engage in agriculture must be restricted by its charter to the ownership and control of not more than one thousand and twenty-four hectares of land. (Sec. 75, act of July 1, 1902, 32 U. S. Stat., 601.)

A corporation organized in any State of the United States or its Territories or insular possessions—that is, any corporation organized outside of the Philippine Islands—is a foreign corporation here, and must comply with the Philippine laws governing the transaction of business in these Islands by foreign corporations.

(4) **Citizenship.**—A citizen of the Philippine Islands is any inhabitant thereof who was a Spanish subject on April eleventh, eighteen hundred and ninety-nine, and then resided and has continued to reside in the Islands, and who did not make a declaration of his desire to retain his Spanish citizenship before some court of record, as provided by the treaty of Paris, and the protocol of April twenty-eighth, nineteen hundred. The children and descendants of the citizens described, born since April eleventh, eighteen hundred and ninety-nine, are also citizens of the Philippine Islands.

Persons of foreign birth who have served in the Army, Navy, or Marine Corps of the United States (which is equivalent to a declaration of intention to become a citizen), or who have declared their intention to become citizens of the United States, can not enter upon, or procure title to, public land in these Islands, and there is no court in the Islands authorized to confer citizenship upon the persons described.

(5) **Location of public land.**—The Spanish Government made no regular survey of the public domain, and the present Government has not yet authorized such a survey, so that neither the extent nor the location of the public lands is definitely known, and no map showing the location of the lands subject to sale can now be furnished. The only information as to the public or private ownership of a given tract may be obtained from the residents of the community in which the land is located, by consulting the records of the old "Registro de Propiedad" and the present register of deeds to see if the particular tracts about which information is sought have ever been registered. The land-tax assessment books of the provincial treasurer may show whether any taxes have been assessed against the land, and, if so, who claims it. The provincial treasurers will give prospective purchasers as much assistance as possible in locating the public lands.

(6) **Form of tract.**—All lands purchased by companies or corporations, whether previously surveyed or not, when the tract is of more than sixty-four hectares, must be taken, whenever it is possible, in contiguous squares of not less than sixty-four hectares each. But a purchaser of one or more tracts of sixty-four hectares may also take in connection therewith one rectangular tract of thirty-two hectares, provided the longer side of such smaller tract is contiguous to the square tract of sixty-four hectares, or to one of such sixty-four hectare tracts, if more than one is purchased.

Sales will not be made of land lying in such a manner as to give the purchaser control of any adjacent land, water, streams, shore line, way, roadstead, or other valuable rights to the prejudice of the interests of the public.

If application is made to purchase unsurveyed public land the tract must be in a single body, as nearly as practicable rectangular in form, and not more than eight hundred meters in length, when applied for by an individual.

(7) **A purchaser may also make homestead.**—An individual may purchase sixteen hectares of land and also enter a homestead, provided he complies with the law as to occupation, or residence, cultivation, improvement, and so forth, as to both tracts. The purchaser is required to occupy, cultivate, and improve the land. Such occupation may be by agent or by himself.

(8) **Application; procedure to purchase.**—Applications to purchase should be made on the blank forms printed and furnished by this Bureau for that purpose. A duplicate application need not be filed. These forms may be obtained upon request from this Bureau or from provincial treasurers who have been designated to act as local land officers.

If application be made by an individual it must be made under oath and give the citizenship of the applicant, his post-office address, the best possible description of the land applied for, that it is nonmineral in character, more valuable for agricultural than for forestry purposes, and does not contain

deposits of coal or salts. Great care should be taken to fill out all blank spaces in the application. If application be made by a corporation, a certified copy of its charter or articles of incorporation must be filed. If made by an unincorporated association, it must show that each member is qualified to enter public lands, under this chapter.

It is not necessary to have land surveyed in order to describe it in the application, nor is it necessary to employ a draftsman to make the sketch map called for by the application blank. The description and sketch are only advisory to the land officials, but must be as full and complete as possible. A stake should be firmly set in the ground at each corner of the tract which it is desired to purchase, and the approximate distance between the stakes stated. The names of the adjoining landowners should be given, and if the land is near a road or stream of water the name and distance to such road or stream of water should be stated. There is no objection, however, if an applicant desires, to have the land surveyed and the plat made by an expert, but the applicant must bear the expense thereof. At the end of the application the sketch map should show the points of the compass; the boundaries and names of adjoining landowners; the length of each portion of the boundary, as nearly as practicable, in meters; all roads, streams of water, and any other natural objects with their names.

(9) *Sale ordered; appraisal; bids.*—After the application has been received and it has been determined from the report of the Director of Forestry that the land is more valuable for agricultural than forestry purposes, and the sale authorized by the Secretary of the Interior, the land will be appraised by this Bureau and advertisement made for sealed bids therefor. The applicant and any other qualified person or company may submit bids for the land. An individual will not be allowed to bid upon sixteen hectares or less embraced in the application of a corporation or other association of persons covering more than sixteen hectares. All bids must be sealed and addressed to the Director of Lands. Each bidder must inclose with his sealed bid a certified check or post-office money order made payable to the Director of Lands, or order, for twenty-five per centum of the amount of the bid. If, upon opening the bids, it is found that the highest price is offered by more than one bidder, and one of such bidders is the original applicant, the land will be awarded to the original applicant. If, however, the original applicant is not one of such bidders, then the land will be at once put up for oral bidding and awarded to the highest qualified bidder upon his depositing twenty-five per centum of the amount of his bid and making proper application for the land, if he has not already done so.

All bids will be opened at the time and place designated in the advertisement and the land awarded to the highest qualified bidder; and all bidders other than the original applicant, at the time of submitting their bids, must also submit an application to purchase the land described in the advertisement. The application should be inclosed with the bid and must be on file in this Bureau on the date of the opening of the bids. All bidders are entitled to be present at the opening of the bids, either in person or by agent, and, if by agent, such agent must have a power of attorney from the bidder he represents. The appraised value of the land, which must not be less than ten pesos per hectare, will be announced in the advertisement for bids, and any bid for less than the appraised value will not be considered.

(10) *Payment.*—The balance of purchase price of the land, after deducting the deposit made by the bidder, may be paid in full upon the making of the award, or in five equal annual installments, or in full at the expiration of five years from the date of the award. All sums of money remaining unpaid after the date of the award will bear interest at six per centum per annum, from such date until paid. Deposits of all unsuccessful bidders will be returned at once.

(11) *As to adverse occupant.*—If application is made to purchase agricultural public land, and such land is actually occupied by another person who is qualified to make a homestead or other entry thereof, or by any native who is entitled by law to a free patent, such person shall be personally served with notice as to his rights and allowed a preference right for one hundred and twenty days from the date of service of such notice in which to make entry or apply for patent. If such person does not avail himself of his rights, he must voluntarily vacate the land or he will be legally ejected.

(12) *Patent.*—Patent will not issue to a purchaser until five years from the date of the award, and during that five years the purchaser must occupy, cultivate, and improve the land, and when proof of such occupancy, cultivation, and improvement has been made he must also make affidavit that he has not sold the land, nor in any manner encumbered the title thereto.

(13) **Survey, payment for.**—A survey and plat must be made before patent issues. If the purchaser be a corporation, like association, or an unincorporated company, and if the survey be made in advance of the regular survey of the Islands, the cost of the survey must be borne by the purchaser; if the purchaser be an individual, the cost will be borne by the Insular Government.

(14) **Revenue stamp.**—Paragraph six, section one hundred and sixteen, Act Numbered Eleven hundred and eighty-nine, requires that a twenty-centavo internal-revenue stamp be affixed to each certificate issued by an officer authorized to administer oaths. These stamps should be attached at the places indicated on the application.

(15) **Penalty for false oath.**—Section seventy-seven of The Public Land Act provides that any person who shall willfully and knowingly make false proof or a false affidavit in support of his application or claim respecting the lands of the Philippine Islands shall be deemed guilty of perjury and punished accordingly.

J. W. ANDERSON,
Acting Director of Lands.

Approved, November 23, 1905:

DEAN C. WORCESTER, *Secretary of the Interior.*

Act No. 926, Philippine Commission.

CHAPTER II.

SALES OF PORTIONS OF THE PUBLIC DOMAIN.

Sections 10 to 21 inclusive (see pages 463-465).

Proclaimed in force by Civil Governor July 26, 1904.

Section 75, Act of July 1, 1902 (32 U. S. Stat., 691).

SEC. 75. That no corporation shall be authorized to conduct the business of buying and selling real estate, or be permitted to hold or own real estate except such as may be reasonably necessary to enable it to carry out the purposes for which it is created; and every corporation authorized to engage in agriculture shall by its charter be restricted to the ownership and control of not to exceed one thousand and twenty-four hectares of land; and it shall be unlawful for any member of a corporation engaged in agriculture or mining and for any corporation organized for any purpose except irrigation to be in any wise interested in any other corporation engaged in agriculture or in mining. Corporations, however, may loan funds upon real-estate security and purchase real estate when necessary for the collection of loans, but they shall dispose of real estate so obtained within five years after receiving the title. Corporations not organized in the Philippine Islands, and doing business therein, shall be bound by the provisions of this section so far as they are applicable.

Forms Pertaining to the Public Lands.

THE GOVERNMENT OF THE PHILIPPINE ISLANDS.

DEPARTMENT OF THE INTERIOR.

BUREAU OF LANDS.

FORM No. 8.

Sales Application.

(By AN INDIVIDUAL.)

BUREAU No. _____

LOCAL LAND OFFICE No. _____

1. The undersigned hereby makes application to purchase the following-described tract of land under the provisions of Chapter II of The Public Land Act, No. 926, to wit: _____ situate in the barrio of _____, municipality of _____, Island of _____.

Province of -----, Philippine Islands, and containing an area of ----- hectares ----- ares and ----- centares; said tract being as nearly as practicable rectangular in shape and not more than 800 meters in length, as indicated by the accompanying rough sketch.

2. To show that the qualifications required by law are possessed by the applicant, the following statement of facts is submitted:

3. My name is -----; my age is ----- years; the place of my birth was -----; I am a citizen of -----, and my post-office address is -----.

4. I have never heretofore purchased or otherwise acquired any land or interest therein under the provisions of The Public Land Act, except as follows: -----

5. If the land herein applied for is awarded to me, it is my intention to occupy, cultivate, and improve it, and said land will not be sold or in any manner encumbered prior to the issuance of the patent therefor. The provisions of the public-land laws relating to purchases of public land are understood and will be fully complied with by me.

6. I have been upon and examined the land applied for, and it contains no indications of settlement or occupation, and to the best of my knowledge, information, and belief it is unoccupied, unreserved, unappropriated, nonmineral agricultural public land; contains no valuable deposits of coal or salts, and is more valuable for agricultural than forestry or other purposes.

(Signature of applicant.)

AFFIDAVIT.

PHILIPPINE ISLANDS, PROVINCE OF ----- }
MUNICIPALITY OF ----- } ss.

7. I, -----, the person making this application, first being duly sworn, upon my oath depose and say: That I have read or have had read to me and thoroughly understand the foregoing application; that I signed said application and this affidavit in the presence of the officer who swore me; that each and every statement in said application is true and correct. So help me God.

8. Before me, at the place aforesaid, on this ----- day of -----, 190 , personally appeared -----, personally known to me to be the person whose name appears in the foregoing application, and in my presence he signed the said application and subscribed and swore to this affidavit.

9. The affiant exhibited to me his cedula, which was No -----, issued at ----- on the ----- day of -----, 190 , which showed him at the date of said cedula to be ----- years of age, and a native of -----

{ Here attach a 20-
centavo internal-
revenue stamp. }

(Officer authorized to administer oaths.)

(Official title.)

SPACE FOR SKETCH MAP.

(The services of a surveyor or expert draftsman are not required.)

FORM No. 9.

Sales application.

(By AN UNINCORPORATED COMPANY.)

BUREAU No.-----

LOCAL LAND OFFICE No.-----

1. The undersigned hereby makes application to purchase the following-described tract of land under the provisions of Chapter II of the Public Land Act, No. 928, viz:----- situate in the barrio of -----, municipality of -----, Island of -----, Province of -----, Philippine Islands, and containing an area of ----- hectares ----- ares and ----- centares; said tract conforming in shape to the requirements of section 11 of said Public Land Act, as indicated by the accompanying rough sketch.

2. To show that the qualifications required by law are possessed by the applicant, the following statement of facts is submitted:

3. The unincorporated association or organization on whose behalf I make this application is composed of the following-named persons, the place of birth, citizenship, and post-office address of each being set opposite his name, to wit:

Name.	Place of birth.	Citizenship.	Post-office address.
-----	-----	-----	-----
-----	-----	-----	-----

4. The main office or principal place of business of the company is at ----- and Mr. ----- is in charge thereof in the capacity of ----- A copy of the articles of agreement of the copartnership, association, or organization is attached hereto and made a part of this application. The retirement from the organization of any of the above-named members, or the addition thereto of any new members not hereinabove named, will be promptly reported to the Director of Lands at Manila.

5. The company in whose behalf I make this application has never purchased or acquired any interest in any land under the provisions of the Public Land Act, No. 928, except as follows:

6. No member of said company has ever purchased or acquired any interest in any land under said Public Land Act, except as follows:-----

7. If the land herein applied for is awarded to said company, it is the intention of the members thereof to occupy, cultivate, and improve the same as required by law; and the land will not be sold or in any manner encumbered prior to the issuance of patent therefor. The provisions of the public-land laws relating to purchases of public land are understood and will be fully complied with by the applicant.

8. The authority of the undersigned to make this application is hereto attached, and the undersigned has been upon and examined the land applied for, and it contains no indications of settlement or occupation, and, to the best of his knowledge, information, and belief, it is unoccupied, unreserved, unappropriated, nonmineral agricultural public land; contains no valuable deposits of coal or salts, and is more valuable for agricultural than forestry or other purposes.

(Signature of person swearing to application.)

(Name of company which is the applicant.)

By -----

AFFIDAVIT.

PHILIPPINE ISLANDS, PROVINCE OF _____ }
 MUNICIPALITY OF _____ } ss.

9. I, _____, the person making this application for said company, first having been duly sworn, upon my oath depose and say: That I am the duly authorized agent of said company; that I signed said application and this affidavit in the presence of the officer who swore me; that each and every statement in said application is true and correct. So help me God.

10. Before me, at the place aforesaid, on this the _____ day of _____, 190____, personally appeared _____, personally known to me to be the person whose name appears in the foregoing application, and in my presence signed said application and subscribed and swore to this affidavit.

11. The affiant exhibited to me his cedula, which was No. _____, issued at _____ on the _____ day of _____, 190____, which showed him at the date of said cedula to be _____ years of age and a native of _____.

{ Here attach a 20-
centavo internal-
revenue stamp. }

 (Officer authorized to administer oaths.)

 (Official title.)

SPACE FOR SKETCH MAP.

(The services of a surveyor or expert draftsman are not required.)

FORM No. 10.

Sales Application.

(BY A CORPORATION.)

BUREAU No. _____

LOCAL LAND OFFICE No. _____

1. Application is hereby made to purchase the following-described tract of land under the provisions of Chapter II of The Public Land Act, No. 926, viz: _____, situate in the barrio of _____, municipality of _____, Island of _____, Province of _____, Philippine Islands, and containing an area of _____ hectares _____ ares and _____ centares; said tract conforming in shape to the requirements of section 11 of said Public Land Act, as indicated by the accompanying rough sketch.

2. To show that the qualifications required by law are possessed by the applicant, the following statement of facts is submitted:

3. The corporation on whose behalf this application is made is known as _____, and was organized under the laws of _____, and its principal place of business or main office is at _____, and Mr. _____ is in charge thereof in the capacity of _____. A certified copy of the charter or articles of incorporation, and the required documentary evidence showing that the law governing the transaction of business in the Philippine Islands by foreign corporations has been complied with, are hereto attached and made a part thereof.

4. The corporation on whose behalf this application is made has never heretofore purchased any land or acquired any interest therein under the provisions of The Public Land Act, No. 926, except as follows: -----

5. No member of said corporation has ever purchased any land or acquired interest therein under said law, except as follows: -----

6. The land owned in the Philippine Islands by said corporation consists of the following tracts of the following areas, and the same is all the land owned by said corporation in the Philippine Islands, viz: -----

7. If the land herein applied for is awarded to said corporation, it is the intention of said corporation to occupy, cultivate, and improve the same as provided by law, and said land will not be sold or in any manner encumbered prior to the issuance of the patent therefor. The provisions of the public-land laws relating to purchases of public land by corporations, and the restrictions, limitations, and requirements of section 75 of the act of Congress of July 1, 1902, are understood and will be fully complied with by the applicant.

8. The undersigned has been upon and examined the land applied for, and it contains no indications of settlement or occupation, and, to the best of his knowledge, information, and belief, it is unoccupied, unreserved, unappropriated, nonmineral agricultural public land, contains no valuable deposits of coal or salts, and is more valuable for agricultural than forestry or other purposes.

(Signature of person swearing to application.)

(Name of corporation making the application.)

By -----

AFFIDAVIT.

PHILIPPINE ISLANDS, PROVINCE OF ----- }
MUNICIPALITY OF ----- } ss.

9. I, -----, the person making this application for the corporation aforesaid, first having been duly sworn, upon my oath depose and say: That I have read and understand the foregoing application; that I signed said application and this affidavit in the presence of the officer who swore me; that I am duly authorized by said corporation to make this application on their behalf; that each and every statement in said application is true and correct. So help me God.

10. Before me, at the municipality aforesaid, on this ----- day of -----, 190 , personally appeared -----, personally known to me to be the person whose name is signed to the foregoing application, and in my presence he signed said application and subscribed and swore to the foregoing affidavit.

11. The affiant exhibited to me his cedula, which was No. -----, issued at ----- on the ----- day of -----, 190 , which showed him at the date of said cedula to be ----- years of age and a native of -----

{ Here attach a 20-centavo internal-revenue stamp. }

(Officer authorized to administer oaths.)

(Official title.)

12.

SPACE FOR SKETCH MAP.

(The services of a surveyor or expert draftsman are not required.)

Bid for Public Land.

The DIRECTOR OF LANDS,
Manila, P. I.

SIR: Referring to your advertisement in the _____ of _____ (date) _____, in which you call for bids for the public land described in Sales Application No. _____, I have the honor to submit my bid of _____ ₱ _____ per hectare, amounting to ₱ _____ for said land.

I inclose herewith a _____ (money order or certified check) _____ for _____ ₱ _____, which is twenty-five per centum of the amount of my bid.

(Bidder.)

P. O. Address: -----

(Bidders should carefully fill out this form and inclose it with the remittance in a sealed envelope. The envelope should be plainly marked "*Bid for public land described in Sales Application No. _____*," and addressed to the Director of Lands, Manila, P. I.

A formal application for the land should accompany this bid if one has not been submitted already.)

(No. 1404.)

An Act providing that provincial treasurers shall perform the duties of local land officers.

By authority of the United States, be it enacted by the Philippine Commission, that:

SECTION 1. Provincial treasurers, under the direction of the Chief of the Bureau of Public Lands, and pursuant to section fifty-two of the Act of Congress approved July first, nineteen hundred and two, entitled "An Act temporarily to provide for the administration of the affairs of civil government in the Philippine Islands, and for other purposes," shall perform the duties of local land officers in their respective provinces. Each province shall constitute a land district.

SEC. 2. The Chief of the Bureau of Public Lands is hereby authorized to make such rules and regulations, subject to the approval of the Secretary of the Interior, as may be necessary and proper for the purpose of carrying the provisions of this Act into full force and effect.

* * * * *

SEC. 4. This Act shall take effect on its passage.

Enacted, October 13, 1905.

Notice to Applicants.

EXECUTIVE ORDER

THE GOVERNMENT OF THE PHILIPPINE ISLANDS,

EXECUTIVE BUREAU,

Manila, June 29, 1906.

No. 31.

The attention of all concerned is invited to the following resolution adopted by the Philippine Commission on June twenty-six, nineteen hundred and six:

"Whereas it is believed that there are in the Philippine Islands many persons neither able properly to prepare applications for public land nor to pay for having such work performed; and

"Whereas, it is believed to be for the best interests of all concerned that such persons be assisted in preparing their applications to enter public land: Now, therefore,

"Be it resolved, that municipal secretaries shall hereafter be required, in addition to their other duties, to prepare, without charge, applications for public land in all cases where the application has reference to land located within the municipality, on the form printed for such purpose, for all persons who are unable to prepare such form."

All municipal secretaries are hereby required to comply with the foregoing resolution.

HENRY C. IDE,
Governor-General.

BUREAU OF LANDS.

HOMESTEAD CIRCULAR

Containing

**Chapter I of the Public Land Act providing for homesteading portions of the public domain and instructions and forms pertaining thereto
issued April 1, 1906.**

The following compilation of laws and instructions thereunder relative to the acquiring of public lands as a homestead, is issued under authority of section 69 of the Public Land Act, Act No. 926, United States Philippine Commission, for the information of the public and the guidance of public officials engaged in the administration of the laws.

Laws.

ACT OF CONGRESS OF JULY 1, 1902.

SEC. 13. That the Government of the Philippine Islands, subject to the provisions of this Act and except as herein provided, shall classify according to its agricultural character and productiveness, and shall immediately make rules and regulations for the lease, sale, or other disposition of the public lands other than timber or mineral lands, but such rules and regulations shall not go into effect or have the force of law until they have received the approval of the President, and when approved by the President they shall be submitted by him to Congress at the beginning of the next ensuing session thereof and unless disapproved or amended by Congress at said session they shall at the close of such period have the force and effect of law in the Philippine Islands: *Provided*, That a single homestead entry shall not exceed sixteen hectares in extent.

ACTS OF THE PHILIPPINE COMMISSION.

[Act No. 926.]

CHAPTER I.

HOMESTEADS ON THE PUBLIC DOMAIN.

Sections 1 to 9 inclusive (See pages 462, 463).

On July 26, 1904, the Civil Governor issued his proclamation declaring the Public Land Act to be in full force and effect from that date, as contemplated by section 13, act of Congress of July 1, 1902, above mentioned.

ACT No. 1404.

AN ACT Providing that provincial treasurers shall perform the duties of local land officers.

(See page 517.)

Instructions.

1. **Location of public lands.**—Owing to the system of disposing of public land which obtained under the Spanish Government in these Islands, the present Government has no maps showing the exact location of such lands; therefore prospective homestead settlers will be compelled to make inquiries, as to the ownership of any particular tract desired, of persons living in the vicinity thereof, and to consult the property register and record of tax returns, in the capital of the province in which the land is located, for evidence of ownership.

2. **Land subject to entry.**—Only unreserved, unoccupied, unappropriated agricultural public land is subject to homestead entry. Land chiefly valuable for the mineral it contains must be purchased under the law relating to mineral land. Whether a particular tract is more valuable for forestry than agricultural purposes will be determined by the Forestry Bureau on request of the Bureau of Lands.

On December 22 and 23, 1905, the Philippine Commission passed the following resolutions extending the provisions of the Public Land Act relating to homesteads to the territory therein mentioned which had theretofore been excepted from the operation of said provisions: ^a

The provisions of the Public Land Act relating to homesteads do not extend to the Provinces of Lepanto-Bontoc, Benguet, and Nueva Vizcaya.^a

3. **Persons entitled to a homestead.**—The following designated persons are entitled to make a homestead entry:

(a) Citizens of the Philippine Islands.

(b) Citizens of the United States, or of any insular possession of the United States.

To be entitled to make an entry a person must be 21 years of age, or the head of a family. Any person, male or female, who is the head of a family, and otherwise qualified, may enter a homestead, even though such person be less than 21 years of age; but a married woman living with her husband is not entitled to make a homestead entry unless she is the head of the family—as where the husband is incapable of supporting himself and family by reason of bodily infirmity.

4. **Area of homestead and shape of tract.**—A homestead can not exceed 16 hectares in area, but any amount less than that may be entered. The approximate area of a tract of land is determined by multiplying the length in meters by the breadth in meters, which will give the area in square meters. Divide the area in square meters by 10,000, and the result will be the area in hectares. The first two figures of the remainder, if any, will be the number of area, and the last two figures will be the number of centares.

Whenever land is sought to be acquired as a homestead which has been surveyed by the Government under some plan for subdividing the public lands, such land must be taken by legal subdivisions. In case an entry is made on unsurveyed land, the tract entered must be in a single body, as nearly as possible rectangular in shape, and not more than 800 meters in length.

5. **Procedure in making entry.**—An approved form on which to make application for a homestead entry may be obtained by addressing the provincial treasurer of the province in which the land is located, or the Bureau of Lands, Manila, P. I.

The approximate length, breadth, and area of the land must be stated. Dimensions must be given in meters, and the area in square meters or hectares. The dimensions and area should appear in paragraph 1 of the application and should also be indicated on the sketch map. If the dimensions and area are not given the application will not be accepted.

The land should be described in such a manner that a person not familiar with the country could, from the description, locate the particular tract applied for. Begin the description by locating the land with reference to some prominent or well-known land mark or a town, stream of water, lake, or church, giving the approximate distance the land lies from the mark selected; then describe the proposed boundary line by naming a point of beginning. State how the point is marked, as by a post, a pile of stones, or a blazed tree, giving the kind of post or tree. State in which direction the proposed boundary line runs from the point of beginning until the next corner is reached, tell how the corner is marked, and so on around to the point of beginning, always giving the

^a See pages 474-476.

direction that the proposed boundary line runs and how each corner is marked. If the proposed boundary line passes near any wellknown land mark or follows a stream of water, give the name of the land mark or stream.

The application should be filed with the provincial treasurer of the province in which the land is located, or with the Director of Lands, Manila, P. I.

Residence and cultivation.—The applicant must continuously reside upon and cultivate the land for a period of five years from the date of establishing his residence on the land after the entry is allowed, as provided in section 2, Act No. 926. Failure to reside on the land for a period of six months will constitute an abandonment of the entry and subject it to cancellation. But occasional visits to the land, once in six months or oftener, do not constitute residence. A claimant must actually reside upon the land and make it a home for himself and family, to the exclusion of a home elsewhere, as well as improve and cultivate it.

7. Contests and adverse claims.—Any person whether qualified to make a homestead entry or not, if he knows of any reason why an application should not be approved, or if any reason why an entry should be canceled, may initiate a contest against the applicant or entryman by filing an affidavit with the Director of Lands, wherein are set out the reasons why the application should be denied or the entry canceled. Upon the termination of a contest, if the application has been disapproved or the entry canceled, the person initiating the contest, if he is qualified under the law to enter a homestead, has a preference right of entry as to the land for sixty days from the date of the final decision on the contest.

8. Procedure to obtain patent.—At any time within three years after the expiration of the five years mentioned in paragraph 6, the applicant may submit proof showing that he has complied with the law in the matter of residence on the land and cultivation and improvement of same. An approved form on which to make this proof will be furnished by the Bureau of Lands. In case the proof is satisfactory a patent will issue.

9. Heirs of a homestead settler.—If the applicant is a married man, and should die after entry and before patent, his surviving widow, by complying with the requirements of the homestead law as to residence and cultivation, may submit proof of this fact and obtain the patent in her name. If the applicant be not married, and should die after entry and before patent, such of his heirs as by law could inherit real estate from him, by complying with the above-mentioned requirements of the homestead law, may submit final proof and obtain the patent.

10. Surveys.—No homestead will be patented until the land has been surveyed and platted. The survey will be made as soon after the final proofs have been approved as it is possible for the surveyors to take up the work, and will be at the cost of the Government.

11. Fees.—The entry fee of ten pesos may be paid at any time after filing the application, but must be paid before entry is allowed. At the time of submitting final proof (see paragraph 8) and before patent will be issued, the final fee of ten pesos must be paid. These are the only fees required by the Government under the homestead law, and may be paid to the Director of Lands, or to the officer designated as local land officer.

12. Miscellaneous.—Attention is invited to the fact that section 77 of the Public Land Act prescribes a penalty for the presentation of false proofs or affidavits in connection with applications or claims respecting public lands.

No land acquired as a homestead may be sold, by judgment of a court or otherwise, to satisfy any debt which may have been contracted by the applicant or patentee prior to the date of the patent therefor. (Sec. 4, Act No. 926.)

C. H. SLEEPER,
Director of Lands.

Approved, March 20, 1906:

DEAN C. WORCESTER,
Secretary of the Interior.

THE GOVERNMENT OF THE PHILIPPINE ISLANDS,

DEPARTMENT OF THE INTERIOR,

BUREAU OF LANDS.

FORM No. 7.

Homestead Application.

BUREAU No. -----

LOCAL LAND OFFICE No. -----

1. I hereby make application to enter the following-described tract of land as a homestead, as provided in Chapter I of The Public Land Act, No. 926, to wit (give as accurate a description as possible, showing boundaries of land, having reference to natural objects and permanent monuments, if any) : situate in the barrio of -----, Municipality of -----, Island of -----, Province of -----, Philippine Islands, containing an area of ----- hectares, ----- ares, and ----- centares; said tract being as nearly as practicable rectangular in shape and not more than eight hundred meters in length, as indicated by the accompanying rough sketch.

2. To show that I am entitled under the law to enter a Homestead on the tract above described, I submit the following statement of facts:

3. My name is -----; my age is ----- years; the place of my birth was -----; I am a citizen of -----,

by birth,
by naturalisation,
by treaty,

 and my post-office address is -----

(If under 21 years of age, applicant must show that he or she is the head of a family.)

4. I have been upon and examined the land applied for, and it contains no indications of settlement or occupation, and to the best of my knowledge, information, and belief it is unoccupied, unreserved, unappropriated, nonmineral, agricultural public land; contains no valuable deposits of coal or salts, and is more valuable for agricultural than forestry or other purposes.

5. I am not the owner of more than sixteen hectares of land in the Philippine Islands, and have not had the benefits of any gratuitous allotment of sixteen hectares of land since the acquisition of the Islands by the United States, nor have I made any other homestead entry. The full extent of my ownership and present interest in lands in the Philippine Islands is as follows:

6. This application is made for land for a homestead for my exclusive personal use and benefit, for the purpose of actual settlement, occupation, residence, and cultivation, and not, either directly or indirectly, for the use or benefit of any other person, persons, corporation, or association of persons.

7. I have read, or have had read to me, and understand the provisions of the Public Land Act relating to the entering and granting of homesteads on the Public Domain of the Philippine Islands, and I will faithfully and honestly endeavor to comply with all the requirements of law on the subject of homesteads.

8. In making this application for a homestead I am not acting as agent of any person, corporation, organization, or association; and I am not in collusion with any person, corporation, organization, or association to give them the benefits of the land entered, or any part thereof, or the timber thereon, or the minerals therein, and I am not entering said land for the purpose of speculation, but in good faith, to obtain a home for myself. I have not, directly or indirectly, made, and I will not make, any agreement or contract, in any way or manner, with any person or persons, corporation, or association whatsoever, by which any title which I may acquire from the Government will or may inure in whole or in part to the benefit of any person, persons, corporation, or association of persons.

(Applicant.)

AFFIDAVIT.

PHILIPPINE ISLANDS, PROVINCE OF _____ } ss.
 MUNICIPALITY OF _____ }

9. I, _____, the applicant, first having been solemnly sworn, upon my oath depose and say: That I have read, or have had read to me, and thoroughly understand, the foregoing application; that I signed said application and this affidavit in the presence of the officer who administered the oath, and that each and every statement in said application is true and correct. So help me God.

10. Before me at the Municipality aforesaid, on this _____ day of _____ A. D. 190 _____, personally appeared _____, to me personally known to be the same person whose name appears in the foregoing application, and in my presence he signed the said application and subscribed and swore to the foregoing affidavit.

11. The affiant exhibited to me his cedula, No. _____, issued at _____, on _____, 190 _____, which showed him at the date of said cedula to be _____ years of age, a native of _____, and a _____ married man.

{ Here attach a 20-centavo internal-revenue stamp.

 (Officer authorized to administer oaths.)

 (Official title.)

NOTE.—Any person who perverts the truth in the narration of facts contained in the foregoing application is guilty of the crime of falsification of a public document, and is punishable with the penalties of presidio mayor, viz: Imprisonment from six years and one day to twelve years, and a fine of from 1,250 pesetas to 12,500 pesetas. (Art. 301, Penal Code).

The officer administering the oath will call the attention of the applicant to the foregoing.

12.

SPACE FOR SKETCH MAP.

(The services of a surveyor or expert draftsman are not required.)

BUREAU OF LANDS.

AGRICULTURAL PUBLIC LANDS

Circular containing

Instructions relative to the leasing of agricultural public lands and sections 13, 17, 18, and 75 of the Act of Congress approved July 1, 1902 (32 U. S. Stats., 691); Chapter III of The Public Land Act (Act No. 926 of the Philippine Commission); and Act No. 1404 of the Philippine Commission, issued May 1, 1906.

Instructions Relative to the Leasing of Agricultural Public Lands.

The following instructions under Chapter III of the Public Land Act, No. 926, providing for the leasing of agricultural public lands, are promulgated, under section 69 of said act, for the information of those concerned. As a supplement hereto will be found a copy of Chapter III of said act, with sections 13, 17, 18, and 75 of the act of Congress approved July 1, 1902, (32 U. S. Stats., 691), a form of notice of application to lease agricultural public land, and a copy of Act No. 1404, providing that provincial treasurers shall act as local land officers.

(1) **Lands which may be leased.**—All unoccupied, unreserved, nonmineral public lands, more valuable for agricultural than forestry uses, are subject to lease. Public lands are such lands of the Government as are subject to disposal under general laws. Mineral lands are such lands as are chiefly valuable for the minerals they contain. Whether lands upon which there is growing timber are more valuable for agricultural than for forestry uses will be determined by the Bureau of Forestry. (See sec. 18, act of Congress of July 1, 1902.)

(2) **Amount which may be leased.**—A qualified person may lease any amount not exceeding 1,024 hectares, equivalent to about 2,530 acres.

(3) **Persons who may lease public lands.**—(1) Citizens of the Philippine Islands; (2) citizens of the United States; (3) citizens of any insular possession of the United States; (4) any corporation or other association of persons organized under the laws of the Philippine Islands or of the United States, or of any State, Territory, or insular possession thereof, authorized by the laws of its creation and by the laws of the Philippine Islands and the acts of Congress applicable thereto to transact business in the Philippine Islands.

(4) **Citizenship.**—A citizen of the Philippine Islands is any inhabitant thereof who was a Spanish subject on April 11, 1899, and then resided and has continued to reside in the Islands, and who did not make a declaration of his desire to retain his Spanish citizenship before some court of record, as provided by the Treaty of Paris, and the protocol of April 23, 1900. The children and descendants of the citizens described born since April 11, 1899, are also citizens of the Philippine Islands.

Foreigners who have served in the Army, Navy, or Marine Corps of the United States (which is equivalent to a declaration of intention to become a citizen), or who have declared their intention to become citizens of the United States, can not enter upon or lease public land in the Islands, and there is no court in the Islands authorized to confer citizenship upon the persons described.

(5) *Relative to corporations.*—Every corporation authorized to engage in agriculture must be restricted by its charter to the ownership and control of not more than 1,024 hectares of land. (Sec. 75, act of July 1, 1902, 32 U. S. Stats., 691.)

A corporation organized in any State of the United States or its Territories or insular possessions—that is, any corporation organized outside of the Philippine Islands—is a foreign corporation here, and must comply with the Philippine laws governing the transaction of business in these Islands by foreign corporations.

(6) *Location of public lands.*—The Spanish Government made no regular survey of the public domain, and the present Government has not yet authorized such a survey, so that neither the extent nor the location of the public lands is definitely known, and no maps showing the location of the lands subject to lease can now be furnished. The only information as to the public or private ownership of a given tract may be obtained from the residents of the community in which the land is located, by consulting the records of the old "Registro de propiedad" and the present register of deeds to see if the particular tracts about which information is sought have ever been registered. The land-tax assessment books of the provincial treasurer may show whether any taxes have been assessed against the land; and, if so, who claims it. The provincial treasurers will give the prospective lessees as much assistance as possible in locating the public lands.

No lease will be permitted to interfere with any prior claim by settlement or occupation until the consent of the occupant or settler is first had and obtained, or until such claims shall be legally extinguished.

(7) *Form of tracts.*—Leased lands, in all cases where possible, must be taken in tracts compact in form as provided in section 23 of the Public Land Act. Tracts to be contiguous must have one boundary in common. The purpose of this provision is to prevent the taking of land in long and irregular strips whereby adjoining public lands would be decreased in value. Leases may not be made of land lying in such a manner as to give the lessee control of any adjacent land, water, streams, shore line, way, roadstead, or other valuable rights, to the prejudice of the interests of the public.

(8) *The Public Land Act extended.*—The application of the provisions of Chapter III of the Public Land Act, in regard to leasing public lands, has been extended by resolution of the Philippine Commission, passed December 22, 1905, to the entire Province of Palawan, formerly known as the Province of Paragua, and to the following portions of districts of the Moro Province: In that portion of the district of Lanao not included in the basin of Lake Lanao; in the entire district of Davao, with the exception of the territory embraced within a circle having a radius of five miles and whose center is the central point in the district jail at Davao; in the entire district of Cotabato, with the exception of Catabato Island on which the town of Cotabato is located, the Island of Tamontaka, the area included within a circle whose radius is three miles and whose center is the central point in the masonry fort at Reina Regente, and the area within a circle whose radius is three miles and whose center is the central point in the masonry fort at Pikit; in the entire district of Zamboanga; and in the Island of Tawi-Tawi in the district of Sulu.^a

(9) *Procedure in obtaining leases.*—Applications to lease public lands should be made on the blank forms printed and furnished by this Bureau for that purpose. A duplicate copy need not be filed. These forms may be obtained on application to the provincial treasurers, who have been designated to act as local land officers. The applicant will fill out the blank form of application, giving as accurate a description of the land as is possible, and send or take same to the provincial treasurer who will send it to this Bureau. The application will not be regularly filed until the notice required by law has been given. This notice will be prepared by the Bureau of Lands, the form of which will be found at the end of this circular. When this notice is sent to the applicant, he will then cause same to be published in two newspapers in both the English and Spanish languages, one of such newspapers being published in Manila and the other near the land, once in each week for the period of six successive weeks. He will also keep a copy of said notice, in both languages above mentioned, posted during the entire period of publication in the newspapers, in the following places: At the front door of the municipal building of the municipality in which the land is located; in a conspicuous place on the land sought to be leased; and on the bulletin board, if any, in the barrio in which the land is

^a See pages 474-476.

located. The Director of Lands will cause a copy of said notice to be posted upon the bulletin board at the office of the Bureau of Lands in Manila. Proof of publication in the newspapers for the required period shall be by affidavit of the managers of said newspapers. Proof of posting shall be by the affidavit of any person familiar with the facts.

If application be made by an individual it must be made under oath and give the citizenship of the applicant, post-office address, location of the land, that it is nonmineral in character, more valuable for agricultural than forestry purposes, and does not contain deposits of coal or salts. Great care should be taken to properly fill out all blank spaces in the application.

If the application be made by a corporation, a certified copy of its charter or articles of incorporation must be filed.

If the application be made by an unincorporated association, it must show that each member is qualified to lease public land under this chapter.

It is not necessary to have the land surveyed in order to describe it in the application, nor is it necessary to employ a draftsman to make the sketch map called for by the application blank. The description and sketch map are only advisory to the land officials, but must be as full and complete as possible. The land should be described in such a manner that a person never having seen it could easily locate the same. A stake should be firmly set in the ground at each corner of the tract which it is desired to lease, and the approximate distance between stakes stated; the names of the adjoining landowners should be given; and if the land is near a road, stream of water, or any natural object, the name of, and distance to, such road, stream of water, or natural object should be stated.

At the end of the application the sketch map should show the points of the compass; the boundaries and names of adjoining landowners; the length of each portion of the boundary as nearly as practicable, in meters; all roads, streams of water, and any other natural objects, with their names.

(10) *Survey.*—The applicant must pay the actual cost of the survey to the Government, plus 10 per cent for the wear and tear of the instruments. The survey must be made by some one authorized by this Bureau. There is no objection, if the applicant desires, to have the land surveyed and a plat made by an expert before the notice is posted and published in the newspapers.

(11) *Adverse occupants.*—If application is made to lease agricultural public land, and such land is actually occupied by another person who is qualified to make a homestead or other entry thereof, or by any native who is entitled by law to a free patent, such person shall be personally served with a notice as to his rights and be allowed a preference right for one hundred and twenty days, from the time of service of such notice, in which to make entry or apply for patent. If such person does not avail himself of his rights, he must voluntarily vacate the land or he will be legally ejected.

(12) *Period of lease.*—Leases shall run for a period of not more than twenty-five years, but may be renewed for a second period of twenty-five years.

(13) *Rent.*—Lessees will be required to pay an annual rent in advance, the amount of which will be fixed by the Director of Lands, with the approval of the Secretary of the Interior, but it can not in any case be less than 50 centavos, Philippine currency, per hectare, and during the second period of lease can not exceed one and one-half pesos per hectare. It is probable that the rate of rental during the first period of twenty-five years will not exceed one and one-half pesos in ordinary cases, but where the land is extremely valuable it may exceed one and one-half pesos per hectare. The first payment of rent is due on the date of the execution of the lease and must be paid before the lease is delivered.

(14) *When lease will be executed.*—As soon as the application has been regularly filed, the Forestry Bureau will be requested to furnish a certificate as to whether or not the land is more valuable for agricultural than for forestry purposes. If this certificate, when received, states that the land is more valuable for agricultural than for forestry purposes, the Director of Lands will, with the approval of the Government, lease the land. He will then advise the applicant of the rate fixed; also of the probable cost of surveying the tract, if same has not been previously surveyed under the direction of this Bureau. Upon completion of the survey, in case there are no adverse claims to the land, a lease will be executed therefor as early as practicable.

(15) *Timber and mineral lands.*—A lessee of agricultural public land has no right to remove timber therefrom, except as authorized by the forestry regulations. No minerals may be removed from agricultural public lands under the

lease. In case it is made to appear that such leased lands contain valuable mineral deposits, the Director of Lands, with the approval of the Secretary of the Interior, is authorized to cancel the lease as to such land.

(16) **Revenue stamps and cedulas.**—Act No. 1189 requires that a 20-centavo documentary stamp be affixed to each certificate issued by an officer authorized to administer oaths. These stamps should be attached at the places indicated on the application. The same act also requires persons to present their cedulas when taking an oath before any officer authorized to administer oaths.

(17) **Penalty for false oath.**—Section 27 of the Public Land Act provides that any person who shall willfully and knowingly make false proof or a false affidavit in support of his application or claim respecting the lands in the Philippine Islands shall be deemed guilty of perjury and punished accordingly.

C. H. SLEEPER, *Director of Lands.*

Approved:

DEAN C. WORCESTER, *Secretary of the Interior.*

FORM.

Notice of Application to Lease Public Lands.

The undersigned hereby gives notice that he will on the _____ day of _____, 19____, file with the Director of Lands, Manila, P. I., an application for a lease to the following described public land, beginning_____

(Here give description as definitely as possible.)

located in the barrio of _____, municipality of _____, Province of _____ and containing _____ hectares, more or less.

Signature of applicant _____

Post-office address _____

All persons claiming any right, title, or interest in or to the above-described land must present such claim to the Director of Lands at Manila before 12 o'clock noon, _____, 19____

Director of Lands.

Dated _____, 19____

Laws.

ACT OF CONGRESS OF JULY 1, 1902.

Section 12 (see page 451)

Section 17 and 18 (see page 452)

Section 75 (see page 461)

ACTS OF THE PHILIPPINE COMMISSION.

[Act No. 926.]

CHAPTER III.—LEASES OF PORTIONS OF THE PUBLIC DOMAIN.

Sections 22 and 31 inclusive (see pages 465-467)

On July 26, 1904, the Civil Governor issued his proclamation declaring the Public Land Act to be in full force and effect from said date, as contemplated by section 13, act of Congress of July 1, 1902, above stated.

[No. 1404.]

AN ACT Providing that provincial treasurers shall perform the duties of local land officers.

(See page 517)

BUREAU OF LANDS.
FREE PATENT CIRCULAR

Containing

Chapter IV of the public land act, providing for the issuance of free patents to native settlers, and instructions and forms pertaining thereto, issued June 11, 1906.

The following instructions, under Chapter IV of the Public Land Act (Act No. 926, as amended by Acts Nos. 979 and 1573), providing for the issuance of free patents to native settlers, are promulgated under section 69 of said act for the information of those concerned. As a supplement thereto will be found a copy of Chapter IV of said act and a copy of Act No. 1404, providing that provincial treasurers shall act as local land officers, and a copy of form to be used in applying for such free patents.

It is not the purpose of this law to allow titles acquired from private sources to be perfected thereunder, but solely to protect native occupants in their rights to land occupied by them as provided in said act.

The following requisites must exist or be complied with before a patent can be obtained under this particular chapter:

(1) The land must be unreserved, unappropriated agricultural public land. Urban property and land which can not be cultivated do not fall within this classification.

(2) The applicant must be a native of the Philippine Islands.

(3) The land must have been continuously occupied and cultivated by the applicant, or his ancestors, since August 1, 1898, or it must have been so occupied and cultivated continuously for three years immediately prior to August 1, 1898, and, in addition thereto, so continuously occupied and cultivated from July 4, 1902, until the date of the taking effect of the Public Land Act, July 26, 1904.

(4) The tract must not exceed 16 hectares in area, and but one tract may be secured by the applicant under this chapter.

(5) Persons desiring to avail themselves of the benefits of this chapter must do so prior to January 1, 1907.*

(6) An application must be filed with the local land officer, or, if there be no such officer, then with the Director of Lands, in Manila. This application must be executed under oath and must show the following facts:

(a) The name, age, and post-office address of the applicant.

(b) That he is a native of the Philippine Islands.

(c) The location of the land desired, stating the province, municipality, and barrio in which the same is situated, and as accurate a description as may be given, showing the boundaries of the land, having reference to natural objects and permanent monuments, if there be any.

(d) That the land is not claimed or occupied by any other person.

(e) It must give the date when the applicant or his ancestor entered into occupation and began the cultivation of the land, and what improvements have been made.

* Act No. 1573 of the Philippine Commission, enacted December 12, 1906, extends from January 1, 1907, to January 1, 1909, the time within which native settlers may file applications for free patents. Wherever the date January 1, 1907, appears herein, same should now read January 1, 1909.

See page 478.

(f) If the applicant claims through the entry, occupation, and cultivation by his ancestor, the application must show the name of such ancestor and his relationship to the applicant, and the applicant must file satisfactory evidence of the date and place of the death and burial of such ancestor. The patent will then be issued in the name of such heirs.

(7) The applicant must sign the application and appear before a notary public, or other officer authorized to administer oaths, and make affidavit as to the truth of the statements contained in the application, and such officer must attach his certificate to the application. A 20-centavo internal revenue stamp must be affixed to this certificate.

The Director of Lands will cause a careful investigation to be made into the truth of the allegations in the application, and, if satisfied that the applicant comes within the provisions of said Chapter IV, will cause the land to be surveyed and an accurate plat made thereof, and have notice that such application has been made published in the municipality and barrio in which the land is located, in order that adverse claimants may have an opportunity to present their claims. If adverse claimants do not appear to oppose the issuance of patent within a reasonable time (to be fixed in the discretion of the Director of Lands), a patent for such lands will be issued to the applicant.

No patents will be issued until the aforesaid survey and plat have been made and notice of application published. The expense thereof will be borne by the Insular Government.

The land covered by the patent secured as aforesaid shall be inalienable for a period of seven years, and shall not be subject to incumbrances for a like period. It shall not be liable for the satisfaction of any debt contracted prior to the expiration of such period.

C. H. SLEEPER, *Director of Lands.*

Approved November 22, 1905:

DEAN C. WORCESTER, *Secretary of the Interior.*

Chapter IV of the Public Land Act.

CHAPTER IV.

FREE PATENTS TO NATIVE SETTLERS.

Sections 32 to 35 inclusive (see pages 467-468)

NOTE.—Attention is called to the fact that by resolutions of the Philippine Commission, passed December 22 and 23, 1905, August 2, and December 29, 1906, the application of the provisions of said Chapter IV was extended to all provinces and districts in the Philippine Islands heretofore excepted.

THE GOVERNMENT OF THE PHILIPPINE ISLANDS.

DEPARTMENT OF THE INTERIOR.

BUREAU OF LANDS.

FORM No. 14.

Application for Free Patent.

BUREAU OF LANDS No.

LOCAL LAND OFFICE No.

1. I hereby make application for a free patent to the following-described tract of land, under the provisions of Chapter IV of the Public Land Act, No. 926, viz (give as accurate a description as possible, showing boundaries of land, having reference to natural objects and permanent monuments, if any) :-----

situate in the barrio of _____, municipality of _____, Island of _____, Province of _____, Philippine Islands, and containing an area of _____ hectares, _____ ares, and _____ centares.

2. I submit the following statement of facts to show that I am entitled to make this application:

3. My name is _____; I am _____ years of age; my post-office address is _____; and I am a native of the Philippine Islands.

4. The land described and applied for is not claimed or occupied by any other person, but is public land. I entered upon and began the cultivation of the same on the _____ day of _____, 19____, with the intent to there establish a home for myself and family, and since that date I have continuously resided upon and cultivated the land, and have made thereon the following improvements, viz: _____

(NOTE.—If applicant claims through ancestor, paragraphs 5, 6, and 7 must be filled out.)

5. The land described and applied for is not claimed or occupied by any other person, but is public land. It was first entered upon and cultivated and occupied as a home on or about the _____ day of _____, 19____, by _____, who was my _____. My said ancestor died on the _____ day of _____, 19____, at _____, Province of _____, and was buried at _____, Province of _____, on the _____ day of _____, 19____. Evidence of relationship, death, burial, and heirship is hereto attached and consists of _____

(NOTE.—Heirship must be judicially determined in regular administration proceedings, and a certified copy of the decree affixed hereto.)

The following are the names and addresses of the heirs of my said ancestor:

NAME.	POST-OFFICE ADDRESS.
_____	_____
_____	_____
_____	_____

6. Since the death of my said ancestor I have resided upon and cultivated said land, and the improvements now on the land consist of the following, viz: _____

7. The land has been continuously occupied and cultivated by me, or by my said ancestor, since the date of entry thereon, as above stated, except during the following-named periods, when the land was not occupied, for the reason stated, viz: _____

8. The land applied for is now occupied and cultivated by me, and to the best of my knowledge, information, and belief it is otherwise unreserved and unappropriated, and is nonmineral, agricultural public land, contains no valuable deposits of coal or salts, and is more valuable for agricultural than forestry or other purposes.

9. The following named witnesses will testify that the allegations of this application are true:

NAME.	POST-OFFICE ADDRESS.
_____	_____
_____	_____
_____	_____

(Applicant.)

AFFIDAVIT.

PHILIPPINE ISLANDS, PROVINCE OF _____ }
 MUNICIPALITY OF _____ } ss.

10. I, _____, the person making the foregoing application, first being duly sworn, upon my oath depose and say: That I have read, or have had read to me, and thoroughly understand the foregoing application; that I signed the same and this affidavit in the presence of the officer who administered the oath; that each and every statement in said application is true and correct. So help me God.

11. Before me, at the place aforesaid, on this _____ day of _____, 19____, personally appeared _____, to me personally known to be the person whose name appears in the foregoing application and in my presence signed the said application and subscribed and swore to this affidavit.

12. The affiant exhibited to me his cedula, No. _____, issued at _____ on the _____ day of _____, 19____, which showed him at the date of said cedula to be _____ years of age and a native of _____.

{ Here attach a 20-
centavo internal-
revenue stamp. }

 (Officer authorized to administer oaths.)

 (Official title.)

(NOTE.—Any person who perverts the truth in the narration of facts contained in the foregoing application is guilty of the crime of *falsification of a public document* and is punishable with the penalties of *presidio mayor*, viz, imprisonment for six years and one day to twelve years, and a fine of from 1,250 pesetas to 12,500 pesetas. (Art. 301, Penal Code.)

(The officer administering the oath will call the attention of the applicant to the foregoing.)

SPACE FOR SKETCH MAP.

(The services of a surveyor or expert draftsman are not required.)

 [No. 1404.]

AN ACT Providing that Provincial Treasurers shall perform the duties of local land officers.

(See page 517.)

BUREAU OF LANDS.

PRIMER

Containing

Questions and answers on the public land laws in force in the P. I. issued
February 26, 1906.

Public Lands.

(1) **QUESTION.** What is the difference between *public* land and *private* land?

ANSWER. Public land is land the title to which is in the Government and which is administered by the Government for the benefit of the whole people. No one can get this land for himself except in the way ordered by the Government. Public land is also called Government land because the Government controls it. Public land does not belong to the officials or officers of the Government. It belongs to the Government, which holds it for the benefit of all the people. Land which is owned by private persons is called private land. When any person buys public land from the Government, or gets title to public land in the way ordered by the Government, it becomes private land.

(2) **Q.** Which lands can not be taken up under the Public Land Act?

A. Private lands; lands which have been reserved for the use of Government farms, military reservations, forest reserves, schools, parks, etc.; and the lands recently purchased by the Philippine Government, commonly known as Friar Lands.

(3) **Q.** Is there very much public land in the Philippines?

A. It was estimated several years ago that there are 8,400,000 hectares of agricultural lands and twice that amount of forest lands on the public domain. Some of the forest lands will become agricultural lands when the timber is cut off.

(4) **Q.** Where is this public land?

A. It is in many provinces. Nearly all of the mountains and most of the land that is unplanted and far away from the towns is public land. In Luzon these provinces have much public land: Cagayan, Isabela, and Nueva Vizcaya. All the provinces have some public land. Much of this land is good land. (See Question 61.)

(5) **Q.** Why is there so little private land?

A. Because the Filipinos have not tried hard to get land of their own. They have worked on the lands of other people. They have not often enough sought and planted new land for themselves.

(6) **Q.** Why did not the Filipinos try to get land for themselves?

A. They did not know where the public land was. They did not know how to get it. Also they did not like to move away from their homes to distant places. If a man wishes to have land and a home of his own, he must be willing to leave for a while his town and his amusements and friends. This is the way the early settlers of America and many other countries did.

(7) **Q.** How can a Filipino get public land so that it may be his?

A. In three ways—by making a homestead on public land; by gift from the Government; by buying it from the Government. A person may lease land from the Government, which gives him the right to live on it, to use and to cultivate it. If a person leases land from the Government, he does not own it.

(8) **Q.** What are the different amounts of land that a man may get from the Government by the various land laws?

A. If the lands are taken in order named below a man may own or control the following amounts of public land:

- (1) Sixteen hectares as a homestead.
- (2) Sixteen hectares by purchase.
- (3) One thousand and twenty-four hectares by lease.

(9) Q. Is it necessary to put revenue stamps on the application for public lands?

A. Yes. Each time a notary public administers an oath he must see that a twenty centavo internal revenue stamp is attached to such oath, and also must see the cedula of the person to whom he administers oath, if such person is required by law to have a cedula.

Free patents to public lands.

(See Chapter IV, Public Land Act.)

(10) Q. What kind of public land may be obtained under a free patent?

A. Unreserved, unappropriated, nonmineral agricultural public land.

(11) Q. What is a "free patent" to public land?

A. It is a document giving absolute title to a tract of public land without charge.

(12) Q. Who may obtain free patents to public lands?

A. Only natives of the Philippines.

(13) Q. How is the right to a free patent obtained?

A. A free patent is given to any native of the Philippine Islands who has lived on public land without a title a certain number of years before January 1, 1907.*

(14) Q. How long must a Filipino have lived on and cultivated public land to obtain a free patent?

A. From August 1, 1898, to the present time. If his ancestors have occupied and cultivated the land during part of this time and he the rest of the time, he is entitled to a free patent. Also, if he and his ancestors continuously occupied and cultivated the land from August 1, 1895, to August 1, 1898, and from July 4, 1902, to July 26, 1904, he may claim a free patent, even if he and his ancestors did not live on the land between August 1, 1898, and July 4, 1902.

(15) Q. How large a tract of land may be obtained under a free patent?

A. Not more than sixteen hectares, or about forty acres.

(16) Q. Will a free patent be given for more than one piece of land if the total area is not more than sixteen hectares?

A. No. One individual can obtain a free patent to only one tract of land.

(17) Q. How can a title be obtained to an additional tract or tracts?

A. By making application to the Court of Land Registration under Chapter VI of the Public Land Act, No. 926.

(18) Q. Before what time must the application be made?

A. The application for a free patent must be made before January 1, 1907.* After such date no application can be considered.

(19) Q. To whom must the application for free patent be sent?

A. To the provincial treasurer, who is local land officer in each province.

(20) Q. What must be written in the application for a free patent?

A. The application for a free patent must contain the following information:

- (a) The name, age, and post-office address of the applicant.
- (b) It must state that the applicant is a native of the Philippine Islands.
- (c) The location of the land (naming province, municipality, and barrio).
- (d) A description of the land, showing the boundaries, etc.
- (e) A statement that the land is not occupied by any other person.
- (f) A statement that the land has been occupied by the applicant or his ancestors for the prescribed time (see Question 14), and a description of the improvements, if any, that they have made on the land.
- (g) If the claim is based on the holding of land by an ancestor, the name of the ancestor and satisfactory evidence of the date and place of his death and burial must be given.

(21) Q. What notice must be given before a patent will be issued?

A. A written notice of the application must be posted in the municipality and barrio where the land is situated in order to give any person who has a claim to the land an opportunity to present the same.

* Act No. 1573 of the Philippine Commission, enacted December 12, 1906, extends from January 1, 1907, to January 1, 1909, the time within which native settlers may file applications for free patents. Wherever the date January 1, 1907, appears herein, same should now read January 1, 1909. (See page 478.)

(22) Q. When must a survey and plat of the land be made?

A. Some time before the free patent is given.

(23) Q. Who pays the cost of making the survey and the plat?

A. The Government of the Philippine Islands.

(24) Q. May I sell, or borrow money on, the land acquired by a free patent?

A. After seven years from the time the free patent is given, you may borrow money on the land, or you may sell it, but not before the end of seven years.

(25) Q. May the land be sold for debt?

A. Not if the debt was made before the end of the seven years from the time the patent was given.

Homesteads.

(See Chapter I, Public Land Act.)

(26) Q. What public land is subject to a homestead entry?

A. Any unoccupied, unreserved, unappropriated, nonmineral agricultural public land.

(27) Q. What is a homestead?

A. A homestead is the permanent home of a man and his family. The land that the Government gives him and the house that is built on it make the homestead.

(28) Q. Will the Government give a man a house and land?

A. No. It will give him the land, but he must build his own house. The land that the Government gives him is called a homestead.

(29) Q. How much land will the Government give a man for a homestead?

A. The Government will give sixteen hectares, or about forty acres, of public land to Filipinos who will live upon it and cultivate it for five years.

(30) Q. Why does the Government give homesteads to people?

A. Because it is better for the people to have land and homes of their own than to work for other people and live on the lands of others. People who have their own homes are better citizens and more prosperous than those who do not.

(31) Q. To whom will the Government give a homestead?

A. To any citizen of the Philippines, or of the United States, or of any insular possession of the United States, who is more than twenty-one years of age. If a man or woman is the head of a family, he or she may get a homestead even if less than twenty-one years of age.

(32) Q. May a married woman get a homestead?

A. Yes; if her husband will never be able to get food for his family, on account of sickness or insanity.

(33) Q. May the husband and the wife each have a homestead?

A. No; a husband and wife can have only one homestead.

(34) Q. May the son of a family get a homestead?

A. Yes; if he is over twenty-one years of age, or if he is the head of a family, even if not twenty-one years of age.

(35) Q. May a man who already owns land get a homestead?

A. No man who already owns more than sixteen hectares of land may get a homestead from the Government.

(36) Q. May a man get more than one homestead?

A. No.

(37) Q. What is the first thing I must do when I wish to get a homestead?

A. You must first find the Government land which you wish to own as your homestead.

(38) Q. How may I know that the land I want is surely public land?

A. Ask the provincial treasurer. It is his duty to tell you if he knows. Land that no one pays a tax on is probably public land. Tell the treasurer exactly where the land is, and he will tell you whether it is public land or not, as far as his records show.

(39) Q. What must I do next?

A. Ask the provincial treasurer for the blank paper called "Homestead Application, B. L. Form No. 7." This paper has questions on it that you must answer in writing. If you wish, you may write to the Director of Lands, Manila, and ask him to send you a copy of this paper.

(40) Q. What must I tell in this paper?

A. You must tell these things:

- (a) Your name and post-office address.
- (b) You must say in what province, municipality, and barrio the land is.
- (c) You must say that the land contains no coal, salt, or valuable mineral, like gold or silver. You must also say that the land is more useful for farming than for cutting timber.
- (d) You must say that no one lives on the land.
- (e) You must say that you want this land for yourself; that you will live on it and cultivate it. You must also say that you are not getting this land for any other person.
- (f) You must describe the land.

(41) Q. What do you mean by "describe"?

A. You must tell exactly where the land is and what its shape is. If the land is near a road or river you must say so. You must say who owns the land all around it. You should drive a stake into the ground at each of the four corners of your land and measure the distance between the stakes. You should pick out a piece of land that is rectangular in form, and not more than eight hundred meters long. If you choose a square piece of land containing sixteen hectares, each side of the square will be four hundred meters long.

(42) Q. When I have answered all the questions in the paper, what must I do next?

A. You must go before a notary public, or other officer authorized to administer oaths, and swear that all you have said in the paper is true.

(43) Q. Where shall I send this paper?

A. You must send the paper to the provincial treasurer.

(44) Q. What must I pay when I send in this application?

A. You must pay ten pesos at the time you send in the application, and you must also pay twenty centavos for a revenue stamp to be attached to your oath.

(45) Q. Is this all I will have to pay to get a homestead?

A. No; at the end of five years you must pay ten pesos more.

(46) Q. What must I do to gain a homestead?

A. You must live five years on the land. You must cultivate and improve the land.

(47) Q. May I go away from my homestead for a short time?

A. Yes; you may personally go away from your homestead for not more than six months at one time, but you must maintain your legal residence thereon.

(48) Q. Must I obtain permission to temporarily cease to reside on my homestead?

A. Yes; you must secure such permission from the Director of Lands at Manila.

(49) Q. What reason must I give for asking permission to temporarily cease to reside on my homestead?

A. Permission will be given for reasons as follows: War or an insurrection, total or partial failure of crops, sickness, or to earn money with which to make improvements on the land.

(50) Q. May I own a house in town, or elsewhere, and go there to spend Sundays and holidays?

A. Yes.

(51) Q. If I am absent from the homestead for more than six months at one time what will happen?

A. You will lose all claim to the land if you are absent from it more than six months at one time.

(52) Q. Suppose I die before I gain full right to the land?

A. If you have a wife she will have a chance to complete the five years of residence and so gain the homestead. If you die unmarried the claim to the land will go to those persons who would have had your land if you had died fully owning it.

(53) Q. What must I do five years after date of filing application for a homestead?

A. You must furnish the Bureau of Lands with "final proof" as to your homestead.

(54) What is meant by "final proof"?

A. At the end of five years you must show the authorities that you have lived five years on the land and have cultivated and improved the land. Two men

who have no interest in the land must swear that you have really done this. To do this is to make "final proof." You may make this final proof at any time within three years after you have lived there five years.

(55) Q. What is the last thing I must do to get a homestead?

A. When you have made final proof you must pay ten pesos. You will have then paid twenty pesos in all for your land. After that there is no more to pay. The Government will then give you a paper called a "patent" or "title." This paper says that you own the land. No one can take that land from you. The Government, before giving you the patent, will survey, or measure carefully, the land. The Government will pay the expense of this survey.

(56) Q. Suppose I owe some money; can the man whom I owe take my homestead?

A. No; your homestead can not be taken from you to pay any debt that was made before the patent was given to you.

Sales of public lands.

(See Chapter II, Public Land Act.)

(57) Q. What public land is subject to sale?

A. Any unoccupied, unreserved, unappropriated, nonmineral agricultural public land.

(58) Q. Who may buy public lands of the Government?

A. Anyone who is a citizen of the Philippine Islands, or of the United States, or of any of the insular possessions of the United States. Several citizens may make a company or corporation to buy land.

(59) Q. Who are citizens of the Philippine Islands?

A. All inhabitants of the Philippines who were residing in the Philippines April 11, 1899, and were at that time subjects of Spain, if they have not made a declaration before a court of record that they wish to remain Spanish subjects. The children and descendants of these citizens, if born since April 11, 1899, are also citizens of the Philippine Islands.

(60) Q. How much land may a citizen, a company of citizens, or a corporation purchase?

A. One citizen may purchase sixteen hectares, or about forty acres. A company of citizens may purchase sixteen hectares for each member if the company is not incorporated. A corporation—that is, a company organized by law—may purchase not more than one thousand and twenty-four hectares.

(61) Q. Where are the public lands that may be bought?

A. The public lands have not been surveyed under either Spanish or American rule. Therefore, it is not known exactly where they are. You may find out by asking the old residents of a town. You may also learn something from the old "Registro de Propiedad" and the "Register of Deeds" now kept. Here you may find whether the land has ever been registered. The provincial treasurer will tell you if the land has ever been taxed. If not, it is probably public land.

(62) Q. May I purchase land on which trees are growing.

A. You may if the land is more valuable for agriculture than for forestry.

(63) Q. What should be the shape of the public land that I purchase?

A. It should be in one piece, as nearly as possible rectangular in shape, and not more than eight hundred meters long.

(64) Q. May I gain a homestead and also buy sixteen hectares of public land?

A. Yes; if you do what the Government requires in the case of both pieces of land. You must occupy and cultivate the land which you buy; you need not live on it yourself. You may have another man live on it and cultivate it for you. But in the case of a homestead, you, yourself, must live on the land.

(65) Q. How shall I make application to purchase public land?

A. You must fill out the answers to the questions on a blank form.

(66) Q. Where can I get this form?

A. You may get this form of the provincial treasurer or of the Director of Lands at Manila.

(67) Q. What must I write in the form?

A. You must tell whether you are a citizen of the Philippine Islands, the United States, or of an insular possession of the United States. You must give the name of the barrio, municipality, and province in which you live. You must describe the land. (See Question 41.)

If a company wants to buy the land it must show in the form that each member of the company has the right to buy land of the Government.

If the company is incorporated, it must send with the form a copy of the paper which contains the rules under which the company was incorporated.

(68) Q. What is done in reply to the request to buy land?

A. If the land, after examination, is found to be more valuable for agriculture than for cutting trees for timber, a fair price is set upon it. It is then advertised in the newspaper as for sale. Those who wish to buy it must make an offer stating the price they are willing to give. The offer must be inclosed in a sealed envelope and sent to the address given in the newspaper. Then, at a time and place mentioned in the advertisement, the envelopes will be opened. The land will be sold to the one who has made the highest offer.

(69) Q. What is done if the two highest bids are equal?

A. If one of such highest bidders is the original applicant, the land will be given to him. If, however, the original applicant is not of such highest bidders, then the land will be at once put up for oral bidding and given to the highest qualified bidder upon his depositing twenty-five per cent of the amount of his bid and making proper application for the land.

(70) Q. Suppose one who buys land of the Government does not obey the rule to occupy and cultivate the land?

A. Then the land goes back to the Government.

(71) Q. Does he get his money back?

A. No; he loses all he has paid.

(72) Q. How are the payments made for public lands?

A. When you make the offer, you must send in the envelope a certified check or postal money order equal to one-fourth of the amount you offer for the land. The check or order must be payable to the Director of Lands, or order. The remaining three-fourths of the sum you offer may be paid in either of the following three ways:

(a) All at once when you receive notice that you may buy the land.

(b) In five equal parts, one a year.

(c) All at the end of five years from the time the land is sold to you.

If your offer for the land is too low, the Government will at once return your money to you.

(73) Q. What interest must I pay on the money which remains unpaid after I have bought the land?

A. You must pay six per cent interest every year on all money which remains unpaid after your offer is accepted.

(74) Q. Suppose the public land I wish is already occupied by some one.

A. If the person living on the land is a person who has a right to gain a homestead or free patent, he must be told his rights and given one hundred and twenty days to ask for the land. He has the first claim during that one hundred and twenty days.

If he does not ask the Government for the land he must leave the land. If he does not leave it you may ask the Director of Lands to compel him to leave it.

(75) Q. When is the land surveyed and who pays for the survey?

A. The survey must be made some time before the patent is given. If one person is buying the land for himself, the Insular Government will pay the cost. If the purchaser is a company or corporation it must pay for the survey.

(76) Q. How long must one occupy and cultivate the land in order to get a patent?

A. Five years. You must prove this just as in the case of a homestead. You must also state that you have not sold the land nor done anything to encumber the title to it.

(77) Q. May I borrow money and give the land as security?

A. No; that would be encumbering the title.

(78) Q. What will it cost per hectare to buy public land?

A. It is not possible to say, as the price will be fixed according to the location and quality of the land. The law says that the price shall not be less than ten pesos per hectare. As the Government wants the people to buy the land, a fair or low price will be put on it.

Leases of public land.

(See Chapter III, Public Land Act.)

(79) Q. What public land is subject to lease ?

A. Any unoccupied, unreserved, unappropriated, nonmineral agricultural land.

(80) Q. What is a lease of public land ?

A. It is a contract or promise on the part of the Philippine Government to allow a person to hold and use a portion of the public land for a certain time at a certain price.

(81) Q. Who may obtain leases of public land ?

A. Any citizen of the Philippine Islands, or of the United States, or of its insular possessions, and a corporation, or any company of persons formed under the laws of these countries and authorized to do business in the Philippine Islands.

(82) Q. How much land may be leased by one person, corporation, or company ?

A. Not more than one thousand and twenty-four hectares—that is, about two thousand five hundred and thirty acres.

(83) Q. May one lease public land without the need of living on it ?

A. Yes; if he employs another man to cultivate the land and live on it.

(84) Q. What must a corporation or company be careful of ?

A. It must use the land it leases only for the purpose for which the corporation or company was lawfully created, and which it may lawfully pursue in the Philippine Islands.

(85) Q. What must be the shape of the land that is leased ?

A. It must be in the form of squares, if possible, if it is more than sixty-four hectares in size. An additional tract of thirty-two hectares may be leased if the long side of this rectangular tract lies along one of the sides of the tract of sixty-four or more hectares.

(86) Q. In what places may land not be leased ?

A. Land may not be leased that is so situated that the holding of it will damage any public interest. For example, if there is a stream at which all the people of a town get their water and do their washing the land on both sides of it may not be leased in such a way as to prevent the people from using the water of the stream. Land may not be leased if it is needed for a public roadway. If a town has a small harbor, and the land on the shore is public land, that land can not be leased if that would prevent the people from using the shore for their boats. If, in any way, the leasing of public land would injure the rights of the public—that is, all the people of a district—that land may not be leased.

(87) Q. To whom must an application for the lease of public land be sent ?

A. To the provincial treasurer.

(88) Q. What must be written in the application ?

A. You must write your name, your post-office address, and tell of what country you are a citizen. You must tell where the land you wish to lease is, and describe it fully. You must say that it does not contain coal or salt or any valuable minerals, and that it is more valuable for agricultural purposes than for cutting timber. If a corporation applies to lease land, it must show in the application that it is properly formed by law, and that it has a right to do business in the Philippine Islands.

(89) Q. What notice must be given if a person intends to lease agricultural public lands ?

A. He must post notices in the English and Spanish languages.

(90) Q. Where must these notices be posted ?

A. They must be posted in four places :

(a) In a place on the land where it can be easily seen.

(b) At the front door of the municipal building of the municipality in which the land is located.

(c) On the bulletin board of the barrio in which the land is located, if any.

(d) On the bulletin board at the office of the Bureau of Lands.

(91) Q. What other notice must be given ?

A. The same notice as the one posted must be published in both the English and Spanish language for six successive weeks in one newspaper in Manila, and in one newspaper near the land applied for (if there be any).

(92) Q. When must this notice be posted and published ?

A. As soon as an application for leasing agricultural public lands is received in the Bureau of lands at Manila a notice will be made and sent to the applicant and he must then make arrangements for posting and publishing the notices.

(93) Q. Who must pay for posting and publishing the notices?

A. The person who intends to lease the land.

(94) Q. For how long a time may leases be made?

A. For not more than twenty-five years. At the end of twenty-five years the lease may be renewed for another twenty-five years.

(95) Q. What rental must be paid yearly during the first twenty-five years?

A. Not less than fifty centavos per hectare yearly.

(96) Q. What rate of rental must be paid during the second lease of twenty-five years?

A. Not more than ₱1.50 per hectare yearly during the second lease of twenty-five years.

(97) Q. When must the rent be paid?

A. Once a year, in advance.

(98) Q. If a man leases public land, may he re-let it to another man?

A. Not unless he first gets the consent of the Director of Lands and of the Secretary of the Interior.

(99) Q. When must the land that is leased be surveyed?

A. The survey must be made before the lease is given. The Director of Lands has charge of this survey. An accurate plat (map) of the land must be made.

(100) Q. Who pays for the survey?

A. The man who leases the land from the Government pays the expenses of the survey.

(101) Q. May the man who leases the land cut timber from it?

A. He may cut timber only in accordance with the general rules of the Bureau of Forestry.

(102) Q. May a man take away from the land he leases stone, oil, coal, salt, or other valuable mineral?

A. No; he must first have the part of this land that contains oil or minerals cut from his lease. He may occupy the land containing oil or minerals under a mining claim, if he desires and complies with the mining law.

Unperfected titles and Spanish grants and concessions.

(103) Q. To whom does this chapter apply?

A. To all persons in the Philippine Islands who own, or claim to own, property, but have no written title showing that the Government has transferred the title to private persons.

(104) Q. How can I know whether I am entitled to the benefit of said chapter?

A. No. By reading carefully paragraphs 1 to 6 of section 54 of Act No. 928, especially paragraph 6.

(105) Q. Why is it necessary that I should avail myself of this chapter, when I and my family have been in possession of the land for many years?

A. Because the Attorney-General of the Philippine Islands has held that no title can be acquired against the Government by prescription. Also because there is no other way of obtaining registered title to your property, as the old methods of *Informaciones Posesorias*, etc., were done away with by the Code of Civil Procedure.

(106) Q. Will all property owners in the Philippine Islands have to ask for registered title under the provisions of Chapter VI?

A. Not all, but about eighty or ninety per cent of them will.

(107) Q. Why is this necessary when it is considered that several hundred thousand persons secured title from the Government when the Spaniards were in power?

A. Because all the land records in the Islands, with the exception of three or four provinces, were destroyed and no record exists showing what lands were thus disposed of by the Government.

(108) Q. But suppose I have the original of the title granted by the Government, do I still have to make application under this Chapter?

A. No. Application can then be made to the Court of Land Registration under the provisions of Act No. 496 (Land Registration Act).

(109) Q. To whom do I make application for registration of titles under this chapter?

A. To the Court of Land Registration, which has its main office in Manila but which holds sessions in all the provinces.

(110) Q. How much does it cost to secure title in the Court of Land Registration under this chapter?

A. If the land and improvement are assessed at ₱200 or less, the fee is only ₱20. If the value is more than ₱200 a deposit of ₱40 and ₱1 for every thousand pesos of the value of the property.

(111) Q. Will the ₱40 and ₱1 per thousand cover all fees in the court?

A. In nearly all cases, yes; but sometimes when there are many people to be notified and the descriptions are long the fees will be more.

(112) Q. Suppose I deposit more than enough money, or too little?

A. If, when the case is decreed by the court, the fees do not amount to as much as you deposited, the Clerk of the Court will return you the difference. If the amount deposited is too small, the clerk will call upon you to remit more when the original amount is expended.

(113) Q. Are there any other fees which I must pay before I can secure my certificate of title?

A. When the value of the property is ₱200 or less, no; but when the value is more than ₱200 you must pay the register of deeds ₱6 and ₱1 per thousand of the assessed value.

(114) Q. What should I do in order to make application?

A. First you should write a letter to the Director of Lands asking that a surveyor be sent to survey your lands.

(115) Q. How much will it cost for survey?

A. Only the actual cost to the Government for the surveyor and his assistants and material, plus ten per cent to cover wear and tear of instruments.

(116) Q. Why should I request a surveyor from the Bureau of Lands?

A. Because before you can secure title from Court of Land Registration your land must be surveyed under direction of the Bureau of Lands, and if survey is not made by a surveyor of the Bureau, or some private surveyor working under direction of the Bureau, at least two or three months will pass after decree of court before you can get your certificate of title, because no certificate can issue until a survey has been made by the Bureau of Lands.

(117) Q. After I have a plan of my land what should I do?

A. Write to the register of deeds of your province, or to the clerk of the Court of Land Registration, and request application blanks.

(118) Q. Do I need any other information?

A. No; because there are full instructions on the back of each application.

(119) Q. What is the best way for me to prove to the Court of Land Registration that I am entitled to secure a registered title to my land?

A. First, you should clearly state in your application all the information required by section 57 of Act No. 926; second, at the time of the hearing of your application by the court you should be prepared to prove by witnesses the statements made in your application. Unless you clearly prove to the court that you have fulfilled the requirements of Chapter VI your application may be denied by the court.

(120) Q. To whom should application and accompanying papers be presented?

A. After the application has been properly filled out, according to instructions, it may be presented, with the necessary deposit, to the register of deeds of your province, or in case there is no register of deeds then to the treasurer of the province, who is acting register of deeds; or it may be forwarded, with deposit, to the clerk of the Court of Land Registration in Manila.

ACTS PERTAINING TO EMINENT DOMAIN AND FORECLOSURE OF MORTGAGE.

EMINENT DOMAIN.

Code of civil procedure—Act No. 190.

* * * * *
SEC. 241. (*As amended by Act No. 665.*) *How the right of Eminent Domain may be exercised.*—The Government of the Philippine Islands, or of any province or department thereof, or of any municipality, and any person, or public or private corporation having by law the right to condemn private property for public use, shall exercise that right in the manner hereinafter prescribed.

The words "public use" in this section shall include the use of land in these Islands for the construction and maintenance of military posts to be occupied by United States forces stationed in the Philippine Islands, and an action in the name of and on behalf of the Philippine Insular Government for the enforcement of the right of eminent domain for the public use thus described may be instituted under this section and the title acquired by the Philippine Government in this land shall be indefeasible and, in furtherance of the use herein described, may be by the Philippine Government, in accordance with a resolution of the Philippine Commission, transferred by a duly executed deed of the Civil Governor to the United States forever.^a

SEC. 242. *The Complaint.*—The complaint in condemnation proceedings shall state with certainty the right of condemnation, and describe the property sought to be condemned, showing the interest of each defendant separately.

SEC. 243. *Appointment of Commissioners.*—If the defendant concede that the right of condemnation exists on the part of the plaintiff, or if, upon trial the Court finds that such right exists, the Court shall appoint three judicious and disinterested landowners of the province in which the land to be condemned, or some portion of the same, is situated, to be Commissioners to hear the parties, and view the premises, and assess damages to be paid for the condemnation, and to report their proceedings in full to the Court, and shall issue a commission under the seal of the Court to the Commissioners authorizing the performance of the duties herein prescribed.

SEC. 244. *Duty of Commissioners.*—Before entering upon the performance of their duties, the Commissioners shall take and subscribe an oath before the Judge, or Clerk, or any Justice of the Peace for the province, that they will faithfully perform their duties as Commissioners, which oath shall be filed in Court with the other proceedings in the case. Evidence under oath may be introduced by either party before the Commissioners, who are hereby authorized to administer oaths on hearings before them, and the Commissioners shall, unless the parties consent to the contrary, go to the premises together and view the property sought to be condemned, and its surroundings, and may examine and measure the same, after which either party may, by himself, or counsel, or both, argue the cause. The Commissioners shall assess the value of the property taken and used, and shall also assess the consequential damages to the property not taken and deduct from such consequential damages the consequential benefits to be derived by the owners from the public use of the land

^a Note: Act No. 665.

* * * * *
SEC. 2. An action for the enforcement of the right of eminent domain on behalf of the Government of the United States may be instituted in the name of the Government of the United States upon the direction of the President of the United States or the Secretary of War, or upon the application of the Commanding General of the United States Army, Division of the Philippines.

Enacted March 5, 1903.

taken, or from the operation of its franchise by the corporation, or by the carrying on of the business of the corporation, or person taking the property: *provided*, the consequential benefits assessed shall in no case exceed the consequential damage assessed; *provided, further*, that nothing in this section shall be so construed as to deprive the owner of the actual value of his property so taken or used.

Sec. 245. *Report of Commissioners.*—The Commissioners shall make full and accurate report to the Court of all their proceedings under their commission; but none of their proceedings shall be effectual to bind the property or the parties until the Court shall have accepted their report and rendered judgment in accordance with its recommendations.

Sec. 246. *Action of Court upon Commissioners' report.*—Upon the filing of such report in Court, the Court shall, upon hearing, accept the same and render judgment in accordance therewith; or for cause shown, it may recommit the report to the Commissioners for further report of facts, or it may set aside the report and appoint new Commissioners; or it may accept the report in part and reject it in part, and may make such final order and judgment as shall secure to the plaintiff the property essential to the exercise of his rights under the law, and to the defendant just compensation for the land so taken, and the judgment shall require payment of the sum awarded as provided in the next section, before the plaintiff can enter upon the ground and appropriate it to the public use.

Sec. 247. *Rights of plaintiff after the judgment.*—Upon payment by the plaintiff to the defendant of compensation as fixed by the judgment, or after tender to him of the amount so fixed, and payment of the costs, the plaintiff shall have the right to enter in and upon the land so condemned, to appropriate the same to the public use defined in the judgment; in case the defendant and his attorney absent themselves from the Court, or decline to receive the same, payment may be made to the Clerk of the Court for him, and such officer shall be responsible on his bond therefor, and shall be compelled to receive it.

Sec. 248. *Effect of exceptions.*—The allowance of a bill of exceptions in condemnation proceedings shall not operate as a supercedas, nor shall the right of the plaintiff to enter upon the land of the defendant and appropriate the same to public use be delayed by appeal to the Supreme Court. But if the Supreme Court shall determine that no right of appropriation on the part of the plaintiff existed, the case shall be remanded to the Court of First Instance with mandate that the defendant be replaced in possession of the property and that he recover the damages sustained by reason of the possession taken by the plaintiff.

Sec. 249. *Costs.*—The costs in all cases under this chapter relating to Eminent Domain shall be paid by the plaintiff; but in case the action is carried to the Supreme Court by the owner, the costs in the Supreme Court shall be paid by the owner if the judgment is affirmed.

Sec. 250. *Fees of Commissioners.*—The Commissioners appointed to condemn land for public uses in accordance with the preceding sections, shall receive a compensation of four pesos per day each for the time actually and necessarily employed in the performance of their duties and in making their report to the Court, which fees shall be taxed as a part of the costs of the proceedings and paid as provided in the preceding section.

Sec. 251. *Final judgment, its record and effect.*—The record of the final judgment in such action shall state definitely by metes and bounds and adequate description, the particular land or interest in land condemned to the public use, and the nature of the public use. A certified copy of the record of the judgment shall be recorded in the office of the registrar of deeds for the province in which the estate is situated, and its effect shall be to vest in the plaintiff for the public use stated the land and estate so described.

Sec. 252. *Power of guardian in condemnation proceedings.*—The guardian or guardian *ad litem* of a minor or person of unsound mind, may, on behalf of his ward, by approval of the Court do and perform any act, matter or thing respecting the condemnation for public uses of the land belonging to such minor or person of unsound mind, which such minor or person of unsound mind could do in such proceedings if he were of age or of sound mind.

Sec. 253. (*As amended by Act No. 665.*) *Persons not notified not affected by such proceedings.*—Nothing herein contained shall be construed so as to injure, prejudice, defeat or destroy the estate, right or title of any person claiming land or any part thereof, or any interest therein, who was not made a party defendant to the condemnation proceedings and did not have actual or constructive notice of the proceedings in such manner as the law requires. *Provided, never-*

theless, That when it shall be made to appear to the court that the interest of each of the several defendants in the land, or any interest therein, can not be clearly ascertained in the proceedings, or when it shall appear that the names of the several owners are not all known and can not be ascertained, the court may order the payment of the amount of damages awarded into court in the manner provided in section two hundred and forty-seven, and direct that it shall there remain until the land and interests therein involved in the litigation shall be brought under the operation of "The Land Registration Act," and it shall thereupon be the duty of all parties claiming the land, or an interest therein, to perfect their claims in the Court of Land Registration. Upon the final perfecting of the title, and proof thereof in the court in which the condemnation proceedings are pending, that court shall adjudge and award the damages that have been allowed to the parties whose rights have been thus established, and shall further adjudge that no other parties are entitled to an interest in said land or the improvements thereon, and the rights of any other persons claiming the land, or any interest therein, shall be forever thereafter barred.

* * * * *

Enacted Aug. 7, 1901.

[No. 294.]

AN ACT Authorizing the exercise of the right of eminent domain as to personal property and property that is partly personal and partly real, and providing the method of procedure for exercising that right.

By authority of the President of the United States, be it enacted by the United States Philippine Commission, that:

SECTION 1. The government of the Philippine Islands and that of any province or department thereof, and of any municipality, shall have the right to condemn private personal property and property that is partly personal and partly real, for public use, and shall exercise that right substantially in the manner provided in sections 241 and 253 inclusive, of Act 190, entitled, "An Act Providing a Code of Procedure in Civil Actions and Special Proceedings in the Philippine Islands," which sections relate to the exercise of the right of eminent domain in relation to real estate.

SEC. 2. The Commissioners to be appointed in accordance with section 243 of said Code for condemnation of personal property and property that is partly personal and partly real shall be three judicious and disinterested residents of the province in which the property to be condemned, or some portion of the same, is situated; or if the same is situated in the city of Manila, then such residents of the city of Manila.

SEC. 3. The Commissioners shall be sworn faithfully to perform their duty, before any authority authorized to administer oaths; they shall receive evidence, examine the property sought to be condemned, hear the parties or their counsel, assess the value of the property taken and used, as is provided in Section 244 of said Code; but, in the case of personal property, they shall assess only the actual value of the property taken and used, and shall allow no consequential damages to the owners of such property.

SEC. 4. The Commissioners shall make report as is provided in Section 245 of said Code, and the Court shall take action upon such report as provided in Section 246, of said Code, the provisions of said sections being hereby made applicable to property that is personal and to such as is partly real and partly personal, as well as to land.

SEC. 5. After the rendition of judgment of condemnation by the Court, the plaintiff shall have the right to take possession of the property so condemned and appropriate the same to the public use defined in the judgment, in the same manner as though the property condemned had been real estate, in the manner defined in Section 247 of said Code.

SEC. 6. Exceptions to the judgment of the Court shall be allowed as in other proceedings, but no stay of judgment shall be allowed pending such exceptions, the effect of exceptions in this respect being governed by Section 248 of said Code, which is hereby made applicable, to personal property and property partly personal and partly real.

SEC. 7. The costs of the action, the fees of the Commissioners, powers of guardians, and the effect of the action upon persons not made parties defendant

to the proceedings and not having actual or constructive notice thereof in such manner as the law requires, shall be governed by sections 249, 250, 252, 253 of said Code.

SEC. 8. The record of the final judgment, in an action for the condemnation of property under this act, shall state definitely the particular property and items thereof condemned for the public use, and the nature of the public use. The effect of such judgment and the payment or tender of payment in accordance with law of the amounts awarded for the property condemned, shall be to vest in the plaintiff the title to the property so described.

SEC. 9. The public good requiring the speedy enactment of this bill, the passage of the same is hereby expedited in accordance with section 2 of "An Act Prescribing the Order of Procedure by the Commission in the Enactment of Laws," passed September 26, 1900.

SEC. 10. This act shall take effect on its passage.

Enacted, November 5, 1901.

[No. 1258.]

AN ACT Making additional provisions to those contained in Act Numbered One hundred and ninety, relating to the exercise of the right of eminent domain in cases where the exercise of such power is invoked by a railroad corporation for the purposes of constructing, extending, or operating its line.

By authority of the United States, be it enacted by the Philippine Commission, that:

SECTION 1. In addition to the method of procedure authorized for the exercise of the power of eminent domain by sections two hundred and forty-one to two hundred and fifty-three, inclusive, of Act Numbered One hundred and ninety, entitled "An Act providing a Code of Procedure in civil actions and special proceeding in the Philippine Islands," the procedure in this Act provided may be adopted whenever a railroad corporation seeks to appropriate land for the construction, extension, or operation of its railroad line.

SEC. 2. In case a railroad corporation is authorized to occupy any part of the public domain for the purpose of construction, extension, or operation of its line, it shall occupy only such portions of the public domain as are by its charter authorized, and the manner of acquiring possession thereof shall be such as is by its charter especially defined.

SEC. 3. (*As amended by Act No. 1592.*) Whenever a railroad corporation is authorized by its charter, or by general law, to exercise the power of eminent domain in the city of Manila or in any province, and has not obtained by agreement with the owners thereof the lands necessary for its purposes as authorized by law, it may in its complaint, which in each case shall be instituted in the Court of First Instance of the city of Manila if the land is situated in the city of Manila, or in the Court of First Instance of the province where the land is situated, join as defendants all persons owning or claiming to own, or occupying, any of the lands sought to be condemned, or any interest therein, within the city or province, respectively, showing, so far as practicable, the interest of each defendant and stating with certainty the right of condemnation, and describing the property sought to be condemned. Process requiring the defendants to appear in answer to the complaint shall be served upon all occupants of the land sought to be condemned, and upon the owners and all persons claiming interest therein, so far as known. If the title to any lands sought to be condemned appears to be in the Insular Government, although the lands are occupied by private individuals, or if it is uncertain whether the title is in the Insular Government or in private individuals, or if the title is otherwise so obscure or doubtful that the company can not with accuracy or certainty specify who are the real owners, averment may be made by the company in its complaint to that effect. Process shall be served upon residents and non-residents in the same manner as provided therefor in Act Numbered One hundred and ninety, and the rights of minors and persons of unsound mind shall be safeguarded in the manner in such cases provided in said Act. The court may order additional and special notice in any case where such additional or special notice is, in its opinion, required.

"When condemnation proceedings are brought by any railway corporation, in any court of competent jurisdiction in the Philippine Islands, for the pur-

pose of the expropriation of land for the proper corporate use of such railway corporation, said corporation shall have the right to enter immediately upon the possession of the land involved, after and upon the deposit by it with the Treasurer of the Philippine Islands of the value of the land, in money, as provisionally and promptly ascertained and fixed by the court having jurisdiction of the proceedings, said sum to be held by the Treasurer subject to the orders and final disposition of the court: *Provided, however*, That the court may authorize the deposit with the Insular Treasurer of a certificate of deposit of any depository of the Government of the Philippine Islands in lieu of cash, such certificate to be payable to the Insular Treasurer on demand in the amount directed by the court to be deposited. The certificate and the moneys represented thereby shall be subject to the orders and final disposition of the court. And in case suit has already been commenced on any land and the money deposited with the Insular Treasurer at the date of the passage of this Act, the said money may, upon proper order of the court, be withdrawn from the Treasury by the railway corporation which deposited the same, and a certificate of deposit, as above described, may be deposited in lieu thereof. And the court is empowered and directed, by appropriate order and writ if necessary, to place the railway corporation in possession of the land, upon the making of the deposit."

Sec. 2. The provisions of this Act shall apply to any railway corporation in the Philippine Islands although its franchise may in terms prescribe the deposit of actual cash.

Sec. 4. Commissioners appointed in pursuance of such complaint, in accordance with section two hundred and forty-three of Act Numbered One hundred and ninety, shall have jurisdiction over all the lands included in the complaint, situated within the city of Manila or within the province, as the case may be, and shall be governed in the performance of their duties by the provisions of sections two hundred and forty-four and two hundred and forty-five, and the action of the court upon the report of the commissioners shall be governed by section two hundred and forty-six, of Act Numbered One hundred and ninety.

Sec. 5. In case it shall appear from the pleadings or from the report of the commissioners, or the court shall otherwise be satisfied of the fact, that the true ownership of the lands sought to be condemned is uncertain and that there are conflicting claims to and diverse interests in any parcel of land sought to be condemned, the court, if satisfied that the real owners of the land have been notified and are before the court, shall, upon rendering judgment for condemnation and for payment of the sum or sums fixed by the court as just compensation for the land taken, order such sum or sums to be paid to the clerk of the court for the benefit of the persons who shall ultimately be adjudged entitled thereto. The sum or sums so awarded shall be governed by the rules laid down in section two hundred and forty-four of Act Numbered One hundred and ninety. Upon the payment by the plaintiff to the defendants of compensation as fixed by the judgment, or after tender to the defendants of the amount so fixed and payment of the costs, or in case the court shall order the compensation paid into court in accordance with the provisions of this section, the plaintiff shall have the right to enter in and upon the land so condemned, and to appropriate the same to the public use defined in the judgment. In case such payment is made into court, the clerk of the court shall be responsible upon his bond for the sum so paid and shall be compelled to receive it. The effect of a bill of exceptions in such case, the provisions as to costs, as to the fees of the commissioners, as to final judgment and its record and effect, as to the powers of a guardian, and as to persons not notified of the condemnation proceedings, shall be such as are defined in sections two hundred and forty-eight to two hundred and fifty-three, inclusive, of Act Numbered One hundred and ninety.

Sec. 6. Any party claiming an interest in money paid into court in accordance with the provisions of the preceding section may litigate in court his claim thereto, and the court shall apportion the sum so paid in among the various claimants thereto as justice shall require, and shall award such costs as to it may seem equitable, but the plaintiff in the condemnation proceedings shall not be a necessary party to the proceedings for the distribution of the sum or sums paid into court, nor be answerable for any costs arising from such litigation.

Sec. 7. The commissioners appointed to investigate and report upon damages to be awarded in condemnation proceedings under this Act may receive a greater compensation than that fixed by section two hundred and fifty, should the court in its order appointing the commissioners fix a greater compensation

than that allowed by section two hundred and fifty of Act Numbered One hundred and ninety, but not to exceed ten pesos per day in all for each commissioner. If additional compensation is to be allowed, the sum to be allowed shall be fixed in the order of appointment.

SEC. 8. The court, in its order of appointment, may direct the commissioners to report when any particular portion of the lands situated within the city of Manila or in any province shall have been passed upon by the commissioners, and may render judgments upon such partial report, and direct the commissioners to proceed with their work as to subsequent portions of the land sought to be condemned, and may from time to time so deal with lands sought to be condemned within the city of Manila or province, as the case may be.

SEC. 9. The proper judge of the Court of First Instance may act upon complaints for condemnation of lands under this Act in vacation time as well as in term time, and may make appointments of commissioners, orders upon the reports of commissioners, and judgments of condemnation and for the awarding and apportioning of damages, at any time when it is convenient so to do, upon due notice to the parties in interest, and may make any orders to expedite proceedings in the same manner and to the same effect as though made in regular term time and in court. It shall be the duty of the court or judge to expedite these proceedings as much as the interests of justice will warrant.

SEC. 10. No judgments entered in pursuance of this Act, apportioning damages among rival claimants, shall be conclusive as to the real ownership of the land effected thereby in proceedings in the Court of Land Registration for the purpose of obtaining a certificate of title.

SEC. 11. The public good requiring the speedy enactment of this bill, the passage of the same is hereby expedited in accordance with section two of "An Act prescribing the order of procedure by the Commission in the enactment of laws," passed September twenty-sixth, nineteen hundred.

SEC. 12. This Act shall take effect on its passage.

Enacted, November 3, 1904.

FORECLOSURE OF MORTGAGE.^a

Code of civil procedure.—Act. No. 190.

* * * * *

SEC. 254. *Where action for foreclosure of real estate mortgage must be instituted.*—An action for the foreclosure of a mortgage, or other incumbrance, upon real estate, or an interest therein, must be brought in the Court of First Instance for the province in which the land, or some part thereof, lies.

SEC. 255. *The complaint in an action for foreclosure of a real estate mortgage.*—In an action for foreclosure of a real estate mortgage, or other incumbrance upon real estate, the complaint shall set forth the date, and due execution of the mortgage, its assignments, if any, the names and residences of the mortgagor and mortgagee, a description of the mortgaged premises, a statement of the date of the note or other obligation secured by the mortgage, and the amount claimed to be unpaid thereon, and the names and residences of all persons having or claiming an interest in the premises subordinate in right to that of the holder of the mortgage, all of whom shall be made defendants in the action.

SEC. 256. *Trial and judgment in foreclosure suit.*—If upon trial in such action, the Court shall find the facts set forth in the complaint to be true, it shall ascertain the amount due to the plaintiff upon the mortgage debt or obligation, including interest, and costs, shall render judgment for the sum so found due, and order that the same be paid into Court, on or before the first day of the next term of the Court immediately succeeding the one at which such order was made, and that in default of such payment, the land shall be sold to realize the mortgage debt and costs.

SEC. 257. *Sale of the mortgaged property.*—When the defendant, after being directed to do so, as provided in the last preceding section, failed to pay the principal, interest and costs, at the time directed in the order the Court shall order the property to be sold in the manner and under the regulations that govern sales of real estate under execution; but such sale shall not affect the rights of persons holding prior incumbrances upon the same estate, or a

part thereof. The sale, when confirmed by decree of the Court, shall operate to divest the rights of all the parties to the action, and to vest their rights in purchaser. Should the Court decline to confirm the sale, for good cause shown, and should set it aside, it shall order a re-sale in accordance with law.

SEC. 258. *Disposition of proceeds.*—The money arising from the sale of mortgaged property, under the regulations hereinbefore prescribed, shall after deduction of costs of sale, be paid to the person foreclosing the mortgage, and when there shall be any surplus, after paying off such mortgage, or other incumbrance, the same shall be paid to junior incumbrances in the order of their priority, to be ascertained by the Court, or if there be no such incumbrances, or there be a surplus after payment of such incumbrances, then to the mortgagor, or his agent or to the person entitled to it.

SEC. 259. *Disposition of proceeds in case the debt is not all due.*—If the debt for which the mortgage or incumbrance was held, is not all due, so soon as sufficient of the property has been sold to pay the amount due, with costs, the sale must cease; and afterwards, as often as more becomes due for principal or interest, the Court may, on motion, order more to be sold. But if the property cannot be sold in portions without injury to the parties, the whole shall be ordered to be sold in the first instance, and the entire debt and costs paid, there being a rebate of interest where such rebate is proper.

SEC. 260. *Judgment for balance after sale of property.*—Upon the sale of any real property, under a decree for a sale to satisfy a mortgage or other incumbrance thereon, if there be a balance due to the complainant, after applying the proceeds of the sale, the Court, upon motion, shall give a decree against the defendant for any such balance for which, by the record of the case, he may be personally liable to the plaintiff upon which execution may issue immediately if the balance is all due at the time of the rendition of the decree, otherwise the plaintiff shall be entitled to execution at such time as the balance remaining would have become due by the terms of the original contract which time shall be stated in the decree.

SEC. 261. *Final record.*—The final record in the action shall set forth in brief, the petition and other pleadings, judgment, orders, the proceedings under the order of sale, and the decree confirming the same, and the name of the purchaser, with a description of the estate by him purchased. A certified copy of such record shall be recorded in the office of the registrar of deeds for the province in which the estate is situated.

* * * * *
Enacted Aug. 7, 1901.

LAND REGISTRATION.

THE LAND REGISTRATION ACT AS AMENDED TO NOVEMBER 1, 1907.

[No. 496.]

AN ACT To provide for the adjudication and registration of titles to lands in the Philippine Islands.

By authority of the United States, be it enacted by the Philippine Commission, that:

SECTION 1. The short title of this Act shall be "The Land Registration Act."

SEC. 2. (*As amended by Act No. 659.*) A court is hereby established to be called the "Court of Land Registration," which shall have exclusive jurisdiction of all applications for the registration under this Act of title to land or buildings or an interest therein within the Philippine Islands, with power to hear and determine all questions arising upon such applications, and also have jurisdiction over such other questions as may come before it under this Act, subject, however, to the right of appeal, as hereinafter provided. The proceedings upon such applications shall be proceedings *in rem* against the land and the buildings and improvements thereon, and the decree shall operate directly on the land and the buildings and improvements thereon, and vest and establish title thereto.^a

The court shall hold its sittings in Manila, but may adjourn from time to time to such other places as the public convenience may require, and may hold sessions at any time in the capital of any province. In the city of Manila, the Municipal Board, and in the provinces, the provincial board, shall provide suitable rooms for the sittings of the Court of Land Registration in the same building with, or convenient to, the office of the register of deeds.

All necessary books, printed blanks, stationery, and office equipment necessary for conducting the business of the court and the clerk shall be paid for from the Treasury of the Philippine Archipelago.^b

The court shall have jurisdiction throughout the Philippine Archipelago, and shall always be open, except on Sundays and holidays established by law. It shall be a court of record, and shall cause to be made a seal, and to be sealed therewith all orders, process, and papers made by or proceeding from the court and requiring a seal. All notices, orders, and process of such court may run into any province and be returnable, as the court may direct.

The court shall from time to time make general rules and forms for procedure, conforming as near as may be to the practice in special proceedings in Courts of First Instance, but subject to the express provisions of this Act and to general laws. Such rules and forms before taking effect shall be approved by the judges of the Supreme Court or a majority thereof.

In this Act, except where the context requires a different construction, the word "court" shall mean the Court of Land Registration.

SEC. 3. The Civil Governor, with the advice and consent of the Philippine Commission, shall appoint two judges of the Court of Land Registration, one

^a See Act No. 627, page 479; See Act No. 926, page 462.

^b Act No. 659:

SEC. 2. All sums of money that have been paid or directed to be paid by the city of Manila for any of the items named in the preceding section, for the benefit of the Court of Land Registration, shall be repaid to the city of Manila from the Treasury of the Philippine Archipelago.

Enacted March 4, 1903.

of whom shall be appointed, commissioned, and qualified as judge of the Court of Land Registration, and the other as associate judge thereof, each of whom may be removed by the Civil Governor, with the advice and consent of the Philippine Commission, and any vacancy shall be filled in the manner in this section provided. Such further associate judges of the Court of Land Registration shall be appointed in the manner in this section provided, as experience shall prove to be necessary, but the necessity for such additional judges shall be determined by act of the Philippine Commission.

SEC. 4. (*As amended by Acts Nos. 1648 and 1699.*) The authority and jurisdiction of the Court of Land Registration shall begin and take effect as soon as the judges thereof are appointed and qualified in the manner required by law for judicial officers. The court may be held by a single judge, and when so held shall have all the authority and jurisdiction committed to said court. Different sessions may be held at the same time, either in the same province or in different provinces, as the judges may decide, and they shall so arrange sessions as to insure a prompt discharge of the business of the court.

All cases arising in the Court of Land Registration in the city of Manila shall be assigned to the regular judges of the court by rotation, as nearly as may be, and all cases arising in said court outside of the city of Manila shall be assigned by districts to the regular judges and the judges at large of the Court of First Instance performing the duties of judges of the Court of Land Registration. The limits of said districts shall be determined by agreement among all of the judges serving on the court. The judge to whom a case is once assigned shall thereafter have exclusive authority and jurisdiction therein unless and until he shall be absent from the Philippine Islands, or shall have voluntarily transferred such case to another judge, or such transfer shall have been authorized by the Secretary of Finance and Justice: *Provided*, That any judge of the Court of First Instance outside of the city of Manila shall, whenever directed in writing to do so by the Secretary of Finance and Justice, hear and make findings of fact in land-registration cases at the times and places prescribed by law for holding regular or special terms of the Court of First Instance in his judicial district whenever any application or applications under this Act shall have been duly published, mailed, and posted for hearing at any such times and places. For the purposes of any such hearing such judge of the Court of First Instance shall exercise all the powers exercised for like purposes by judges of the Court of Land Registration, including the power to determine whether the application has been duly published, mailed, and posted for hearing, and the power of adjournment to such times and places as may be convenient, and, after the hearing, such judge of the Court of First Instance shall return the application and all papers and documents filed in connection therewith and all evidence presented in support thereof or in opposition thereto, together with his findings of fact, by official messenger or registered mail, to the clerk in Manila, who shall thereupon transmit the papers and record in the case to the judge to whom the case has been assigned for decision. Such judge to whom the case has been assigned may, of his own motion, or on motion for a new trial made by any party to the case on proper grounds and in due time, reopen the case, and, with the previous approval in writing of the Secretary of Finance and Justice, return it to the judge of the Court of First Instance of the district in which the findings of fact were originally made for further hearing. Such judge of the Court of First Instance shall thereupon conduct such further hearing and return the application, papers, documents, and evidence and any further findings of fact to the clerk in Manila in the manner hereinbefore provided, to be again delivered to the judge to whom the case has been assigned. But the judges of the Court of Land Registration shall have the same powers of appointing referees in all cases coming before them as are conferred by law upon judges of the Courts of First Instance.

SEC. 5. Citations, orders of notice, and all other process issuing from the court shall be under the seal of the court and signed by the judge or clerk thereof, and shall be served in the manner provided for the service of process in the Code of Procedure in Civil Actions and Special Proceedings, and by the officers therein designated as officers of the court, unless otherwise specially ordered in this Act.

SEC. 6. (*As amended by Act No. 1108.*) In case of a vacancy in the office of judge of the Court of Land Registration, or of his absence or inability to perform his duties, the associate judge shall perform them until the vacancy is filled or any disability is removed.

Any judge at large of the Court of First Instance, appointed by virtue of Act Three hundred and ninety-six, may likewise be required to perform the duties of judge of the Court of Land Registration in any province in the Philippine Islands or in the city of Manila, when directed in writing to do so by the Civil Governor, in which case his acts, proceedings, and judgments shall be of the same validity as though he were a regular judge or associate judge of the Court of Land Registration in the city of Manila or in the province in which he shall perform such duties. In case such order is given, the judge performing duties as judge of the Court of Land Registration shall receive an allowance for traveling expenses in the same manner and to the same extent as he would receive if performing the duties of a judge of the Court of First Instance.^a

SEC. 7. (*As amended by Act No. 1648.*) There shall be a clerk and an assistant clerk of the Court of Land Registration, who shall be appointed by the Attorney-General, with the approval of the Secretary of Finance and Justice. The clerk and assistant clerk shall perform their duties under the control and supervision of the senior judge of the court and may be removed from office for cause by said senior judge.

"The clerk shall have authority, subject to the provisions of the Civil Service Law and with the approval of the Attorney-General, to appoint and employ the necessary deputies, assistants, clerks, translators, stenographers, typewriters, messengers, and other subordinate employees which may be authorized by law.

"The assistant clerk shall act as chief deputy to the clerk of the court and shall perform such other duties as may be assigned to him by the senior judge or the clerk of the court. In case of the death or disability of the clerk, the assistant clerk shall perform the duties of clerk until the vacancy is filled or the disability is removed: *Provided, however,* That any judge of the Court of Land Registration having jurisdiction over any particular case may issue such orders to the clerk with reference to such case as he may deem proper, without the intervention of the senior judge, and the clerk shall comply therewith.

SEC. 8. (*As amended by Act No. 1648.*) Except as otherwise herein provided, the clerk shall have the custody and control, under the general direction of the senior judge of the court, of all papers and documents filed with him under the provisions of this Act, and shall carefully number and index the same. Said papers and documents shall be kept in the city of Manila, in an office to be called the "Land Registration Office," which shall be in the same building as the Court of Land Registration or near said building.

* NOTE :

[No. 1153.]

AN ACT Providing that certain duties in relation to the Bureau of Justice and the Bureau of the Insular Treasury, now required by law to be performed by the Civil Governor, shall be performed by the Secretary of Finance and Justice.

By authority of the United States, be it enacted by the Philippine Commission, that:

SECTION 1. The following administrative acts relating to the Bureau of Justice and to the Bureau of the Insular Treasury, now authorized by law to be performed by the Civil Governor, shall hereafter be performed by the Secretary of Finance and Justice:

(l) To issue an order naming the judge of the Court of Land Registration and judge of the Court of Customs Appeals who shall remain on duty during court vacation, and to direct any judge of the Court of Customs Appeals who is assigned to vacation duty, when in his judgment the emergency shall so require, to hold during the vacation period a special term of the Court of First Instance in any district, either to hear civil or criminal causes and to enter final judgment therein, as provided in section one of Act Numbered Ten hundred and fifty-six; and likewise to assign five months' vacation to a judge of the Court of Land Registration or of the Court of Customs Appeals, as provided in the section and Act last named; likewise to grant leaves of absence to judges of the Court of Customs Appeals and of the Court of Land Registration, a duty which is now not clearly provided for by existing law.

(m) To require a judge at large of the Court of First Instance to perform the duties of judge of the Court of Land Registration in any province of the Philippine Islands or in the city of Manila, as provided in section six of Act Numbered Four hundred and ninety-six, as amended by section one of Act Numbered Eleven hundred and eight.

SEC. 2. The public good requiring the speedy enactment of this bill, the passage of the same is hereby expedited in accordance with section two of "An Act prescribing the order of procedure by the Commission in the enactment of laws," passed September twenty-sixth, nineteen hundred.

SEC. 3. This Act shall take effect on its passage.

Enacted, May 11, 1904.

The clerk shall attend the sessions of the court and keep a docket of all causes, and he shall affix the seal of the court to all process or papers proceeding therefrom and requiring a seal.

When an application is published for hearing at the time and place for holding a regular or special term of the Court of First Instance, as provided in section four of this Act, the clerk shall immediately send the original application, and all papers and documents filed in connection therewith, by official messenger or registered mail, to the judge of the Court of First Instance who is to conduct the hearing.

SEC. 9. (*As amended by Act No. 809.*) The clerk may act in the city of Manila and in any province, and after land has been registered under this Act he may make all memoranda affecting the title, and enter and issue certificates of title as provided herein.

The clerk and assistant clerk of the court, and any deputy thereof acting as clerk during an adjourned session of the court in any province, are hereby made ex officio notaries public and are authorized to perform within the Philippine Islands all the duties appertaining to the office of notary public.

SEC. 10. (*As amended by Acts Nos. 614 and 1699.*) There shall be a register of deeds in the city of Manila and one in each province. The register of deeds for the city of Manila shall be appointed at a salary of four thousand pesos per annum and removed in the manner provided for the appointment and removal of judges by section three. The provincial fiscals and the attorney for the Moro Province shall perform the duties of the register of deeds in their respective provinces. The duties of the register of deeds in the Provinces of Benguet, Nueva Vizcaya, Lepanto-Bontoc, Zambales, Palawan, and Agusan shall be performed by the respective provincial treasurers of said provinces. The registers of deeds, after any land within their respective districts has been registered under this Act, shall have the same authority as the clerk of the Court of Land Registration to make all memoranda affecting the title of such land, and to enter and issue new certificates of title as provided herein, and to affix the seal of the court to such certificates and duplicate certificates of title; but in executing the provisions of this Act the registers of deeds shall be subject to the general direction of the Court of Land Registration, in order to secure uniformity throughout the Islands, and their official designation shall be register of deeds for the province or for the city of Manila, in which their duties are to be performed, as the case may be.⁶

SEC. 11. (*As amended by Act No. 1699.*) The clerk of the Court of Land Registration and all registers of deeds shall be sworn before any official authorized to administer oaths, and a record thereof shall be made in the records of the court. They shall each give a bond to the Government of the Philippine Islands for the benefit of whom it may concern in a sum to be fixed by the court for the faithful performance of their official duties, before entering upon the same. The judge and the associate judges and the clerk of the Court of Land Registration and all registers of deeds will have power to administer oaths in all matters and cases in which an oath is required, whether pertaining to the registration of lands or otherwise. The clerk and his deputy and all registers of deeds shall keep an accurate account of all moneys received, as fees or otherwise, which shall be subject to examination by the Insular Auditor in the city of Manila and by the district auditors in the several provinces, and to revision thereof by the Insular Auditor, and they shall pay over such moneys at the end of each calendar month to the Insular Treasurer, except such moneys as are otherwise disposed of by the provisions of section thirteen of this Act.

In case of a vacancy in the office of the register of deeds for the city of Manila, or his absence or disability, the clerk of the Court of Land Registration shall perform the duties of the register. In case of a vacancy in the office of provincial fiscal or that of the attorney for the Moro Province, or their absence or disability, the deputy fiscal or assistant attorney, or, if there is no deputy or assistant, the provincial treasurer, shall perform the duties of the register of deeds. The clerk of the Court of Land Registration and all registers of deeds may require a bond of indemnification from all deputies, assistants, and employees in their respective offices. The register of deeds for the

⁶ Act No. 1288, enacted Jan. 23, 1905.

SECTION 1. Registers of deeds and provincial treasurers who are performing the duties of registers of deeds are hereby authorized and directed to perform the duties of commercial registers as defined in Title Two of the Code of Commerce: *Provided, however,* That such registers of deeds shall not be required to register vessels or to keep a register of vessels as required in said title.

city of Manila may appoint such deputies, assistants, clerks, stenographers, and translators as may be authorized by law.

SEC. 12. (*As amended by Acts No. 700 and 1108 repealed by Act No. 1699.*)

SEC. 13. (*As amended by Acts Nos. 809, 1108, 1312 and 1699.*) The salary of the judge of the Court of Land Registration shall be ten thousand pesos per annum, and that of the associate judge shall be nine thousand pesos per annum, and that of the clerk of the court shall be five thousand pesos per annum; the salary of any associate judge appointed after July first, nineteen hundred and five, under this Act shall be eight thousand pesos per annum for the first two years of service, and thereafter nine thousand pesos per annum.

All salaries and expenses of the court, including those for necessary interpreters, translators, stenographers, typewriters, and other employees, as well as those of deputy or assistant clerks duly authorized, shall be paid from the Insular Treasury, but the salary of the register of deeds for the city of Manila and of all of his deputies, assistants of clerks duly authorized and appointed, and all the expenses of every kind incident to the office of register of deeds, including necessary books and stationery, shall be paid out of the respective provincial treasuries or out of the Insular Treasury from funds belonging to the city of Manila, as the case may be. All fees payable under this Act for the services of the clerk of the Court of Land Registration shall be paid into the Insular Treasury. All fees payable under this Act for the services of the register of deeds or his deputy or clerks, including those for entry of original certificate of title, issuing all duplicates thereof, for the registration of instruments, making and attesting copies of memorandum on instruments, for filing and registering adverse claims, for entering statement of change of residence or post-office, for entering any note on registration book, for registration of a suggestion of death or notice of proceedings in bankruptcy, insolvency, or the like, for the registration of a discharge of a lease or a mortgage or instrument creating an incumbrance, for the registration of any levy or any discharge or dissolution of attachment or levy or of any certificate of or receipt for payment of taxes or a notice of any pending action, of a judgment or decree, for indorsing of any mortgage lien or other instrument, memorandum of partition, certified copies of registered instruments, shall be paid into the appropriate provincial treasury or into the Insular Treasury for the city of Manila, as the case may be.

All fees payable under this Act for services by sheriff or other officer shall be paid to the officer or person entitled thereto.

Registers of deeds shall pay over to the provincial treasury or to the Insular Treasury, as the case may be, at the end of each calendar month, all funds received by them in accordance with the provisions of this Act.^a

SEC. 14. (*As amended by Acts No. 1108 and 1484.*) Every order, decision, and decree of the Court of Land Registration may be reviewed by the Supreme Court in the same manner as an order, decision, decree, or judgment of a Court of First Instance might be reviewed, and for that purpose sections one hundred and forty-one, one hundred and forty-two, one hundred and forty-three, four hundred and ninety-six, four hundred and ninety-seven (except that portion thereof relating to assessors), four hundred and ninety-nine, five hundred, five hundred and one, five hundred and two, five hundred and three, five hundred and four, five hundred and five, five hundred and six, five hundred and seven, five hundred and eight, five hundred and nine, five hundred and eleven, five hundred and twelve, five hundred and thirteen, five hundred and fourteen, five hundred and fifteen, five hundred and sixteen, and five hundred and seventeen of Act Numbered One hundred and ninety, entitled "An Act providing a Code of Procedure in Civil Actions and Special Proceedings in the Philippine Islands," are made applicable to all the proceedings of the Court of Land Registration and to a review thereof by the Supreme Court, except as otherwise provided in this section: *Provided, however,* That no certificates of title shall be issued

^a Act No. 1699—Enacted Aug. 30, 1907.

SEC. 11. In lieu of one examiner of titles for the city of Manila, which position is by this Act abolished, authority is hereby given for the employment by the Court of Land Registration of a clerk of class eight, and the sum of three thousand pesos, which was appropriated for the payment of the salary of the examiner of titles under the provisions of Act Numbered Sixteen hundred and seventy-nine, is hereby made available for the payment of the salary of such clerk so authorized to be employed.

SEC. 12. Section twelve of Act Numbered Four hundred and ninety-six, Acts Numbered Six hundred and six, Eight hundred and ninety-four, Nine hundred and ninety-one, and Eleven hundred and seven, and section sixty of Act Numbered Nine hundred and twenty-six, and all Acts or parts of Acts in conflict with this Act are hereby repealed.

by the Court of Land Registration until after the expiration of the period for perfecting a bill of exceptions for filing: *And provided further*, That the Court of Land Registration may grant a new trial in any case that has not passed to the Supreme Court, in the manner and under the circumstances provided in sections one hundred and forty-five, one hundred and forty-six, and one hundred and forty-seven of Act Numbered One hundred and ninety: *And provided also*, That the certificates of judgment to be issued by the Supreme Court, in cases passing to it from the Court of Land Registration, shall be certified to the clerk of the last named court as well as the copies of the opinion of the Supreme Court: *And provided also*, That in the bill of exceptions to be printed no testimony or exhibits shall be printed except such limited portions thereof as are necessary to enable the Supreme Court to understand the points of law reserved. The original testimony and exhibits shall be transmitted to the Supreme Court. *And provided further*, That the period within which the litigating parties must file their appeals and bills of exceptions against the final judgment of the Court of Land Registration shall be thirty days, counting from the date on which the party received a copy of the decision, which period may, in the discretion of the court, in writing be extended to sixty days if the hearing of the cases was had in the provinces, or if they relate to lands situated outside of the city of Manila.^a

Where the associate judges, or the judge and an associate judge, sitting together in any proceeding in the Court of Land Registration, shall disagree as to any decision, they shall certify the fact of their disagreement and the record to the Supreme Court of the Islands, which shall thereupon proceed to examine the case and issue a mandate to the Court of Land Registration as to the judgment that should be rendered.

SEC. 15. At the end of the proceedings on appeal, the clerk of the appellate court in which final decision was made shall certify to the Court of Land Registration the final decision on the appeal, and the Court of Land Registration shall enter the final decree in the case, in accordance with the certificate of the clerk of the appellate court in which final decision was made.

SEC. 16. If the party appealing does not prosecute his appeal within the time limited, the original order, decision, or decree shall stand as if no appeal had been taken.

SEC. 17. (*As amended by Acts Nos. 1108, 1648 and 1680.*) The Court of Land Registration, in all matters over which it has jurisdiction, may enforce its orders, judgments, or decrees in the same manner as orders, judgments, and decrees are enforced in the Court of First Instance, including a writ of possession directing the governor or sheriff of any province, or the sheriff of the city of Manila, to place the applicant in possession of the property covered by a decree of the court in his favor; and, upon the request of the judge of the court of Land Registration, the governor or sheriff of any province or the sheriff of the city of Manila, as the case may be, shall assign a deputy to attend the sittings of the court in that province or city; and for the purpose of attending the sessions of the court and enforcing good order in and about the court room, the provincial governor is hereby authorized to designate a provincial guard or a member of the municipal police of the town in which the court is

• NOTE:

[Act No. 1648.]

• SEC. 8. Upon a decision being rendered by any judge serving on the Court of Land Registration, either party in interest may, within thirty days after the decision is rendered by such judge, petition the court *in banc*, consisting of all the judges serving on the court, or at least three of said judges, for a rehearing of the case, and, if it shall appear to such court *in banc* that the decision on which a rehearing is asked is in conflict with any previous decision of the court, or of any judge thereof, or with any decision of the Supreme Court of these Islands, or of any other competent appellate tribunal, then the court *in banc* may, in its discretion, by vote of a majority of its members, grant the rehearing petitioned for, annul the decision of the single judge, and rehear the case sitting *in banc*; and the decision of the court *in banc* shall be the decision of the Court of Land Registration in the case, and may be regularly appealed from as in other cases.

SEC. 9. All Acts and parts of Acts inconsistent with this Act are hereby, to that extent, repealed.

SEC. 10. The public good requiring the speedy enactment of this bill, the passage of the same is hereby expedited in accordance with section two of "An Act prescribing the order of procedure by the Commission in the enactment of laws," passed September twenty-six, nineteen hundred.

SEC. 11. This Act shall take effect on July first, nineteen hundred and seven.

Enacted, May 16, 1907.

held; or if none such is available, to appoint a bailiff, at a salary not to exceed twenty-five pesos per month, to be paid from the provincial treasury, for such time as the court may be in session in said province.

The Court of Land Registration, in all matters over which it has jurisdiction, may issue an injunction for the protection of either or any of the parties in interest in the following cases:

(1) When it appears by the application, by verified petition, or by affidavits that the commission or continuance of some act during the proceedings for registration of title would produce waste or great or irreparable injury to the subject-matter of the registration proceedings.

(2) When it appears during the pendency of the proceedings that either or any of the parties in interest is doing, or is about to do, or is threatening to do, or is procuring or suffering to be done, some act in violation or to the prejudice of the rights of another party to the action respecting the subject-matter of the proceedings and tending to render the judgment ineffectual.

Except as herein provided, preliminary and permanent injunctions shall be obtained, enforced, dissolved, or modified in the same manner as such injunctions are obtained, enforced, dissolved, or modified under the provisions of the Code of Civil Procedure.^a

SEC. 18. Costs shall be taxed in contested cases in the Court of Land Registration in the same manner and for the same items of cost as in Courts of First Instance, where no different provision is made.

ORIGINAL REGISTRATION.

SEC. 19. (*As amended by Acts Nos. 809 and 1108.*) Application for registration of title may be made by the following persons, namely:

First. The person or persons claiming, singly or collectively, to own the legal estate in fee simple.

Second. The person or persons claiming, singly or collectively, to have the power of appointing or disposing of the legal estate in fee simple.

Third. The person or persons claiming, singly or collectively, to own or hold any land under a possessory information title, acquired under the provisions of the Mortgage Law of the Philippine Islands and the general regulations for the execution of same.

Fourth. Infants or other persons under disability may make application by their legally appointed guardians, but the person in whose behalf the application is made shall be named as applicant by the guardian.

The Government of the United States, or of the Philippine Islands, or of any province or municipality therein, may make application through any agency by it respectively and duly authorized. Foreign corporations may apply for and secure registration of title to lands in the name of the corporation, subject only to the limitations applied or to be applied to domestic corporations. Article eighteen of the royal decree of February thirteenth, eighteen hundred and ninety-four, concerning the adjustment and sale of public lands in the Philippine Islands, and article seventy-seven of the regulations for the execution of the same, together with any other provision or provisions of existing law limiting or prohibiting the holding of land in the Philippine Islands by aliens or by foreign associations, companies, or commercial bodies, are hereby repealed.

Fifth. Corporations may make application by any officer duly authorized by vote of the directors.

In case no examiner of titles has been appointed for a judicial district, or in other cases where such action is deemed advisable, the Secretary of Finance and Justice may issue an order that the register of deeds or the provincial fiscal of any province shall perform the duties of examiner of titles within his province, either permanently or until a regular examiner of titles shall be appointed for the judicial district within which the province lies; such order may be revoked at any time by the Secretary of Finance and Justice. In case such order is issued, the register of deeds or the provincial fiscal, as the case may be, shall be entitled, in addition to his regular salary as register of deeds or as fiscal, to receive from the clerk of the court one-half the fee of five dollars provided by law for an examination of title, and the remainder of the fee and the percentage on the value of the land shall be paid into the

NOTE:

^a Act No. 1680.

SEC. 4. All Acts or parts of Acts in conflict with this Act are hereby repealed.

Insular Treasury, notwithstanding the provisions of section thirteen of this Act or any other provisions of existing law.

The court is authorized to detail an examiner of titles appointed for one judicial district to perform duties in another district whenever in its judgment the public interest will be served thereby.

The judges of the Court of Land Registration and the clerk of the court or any deputy thereof, and the examiners of titles, in going to and from their respective places of residence to other provinces upon the business of the court, shall be allowed their actual and necessary traveling expenses and actual subsistence expenses, the latter not to exceed two dollars, money of the United States, per day. When transportation by steamship, Government transport, or otherwise includes subsistence, no per diem shall be paid or allowed for such portion of the journey.

But the authority given to the foregoing five classes of persons is subject to the following provisos:

(a) That one or more tenants for a term of years shall not be allowed to make application except jointly with those claiming the reversionary interest in the property which makes up the fee simple at common law.

(b) That a mortgagor shall not make application without the consent in writing of the mortgagee.

(c) That a married woman shall not make application without the consent in writing of her husband unless she holds the land as her separate property or has a power to appoint the same in fee simple, or has obtained a decree of the court authorizing her to deal with her real estate as though she were sole and unmarried.

(d) That one or more tenants claiming undivided shares less than a fee simple in the whole land described in the application shall not make application except jointly with the other tenant owning undivided shares, so that the whole fee shall be represented in the action.

But, notwithstanding the foregoing provisos, if the holder of a mortgage upon the land described in the application does not consent to the making of the application, it may be entered nevertheless and the title registered subject to such mortgage, which may be dealt with or foreclosed as if the land subject to such mortgage had not been registered. But the decree of registration in such case shall state that registration is made subject to such mortgage, describing it, and shall provide that no subsequent certificate shall be issued and no further papers registered relating to such land after a foreclosure of such mortgage.

Instruments known as *pacto de retro*, made under sections fifteen hundred and seven and fifteen hundred and twenty of the Spanish Civil Code in force in these Islands, may be registered under this Act, and application for registration thereof may be made by the owner who executed the *pacto de retro* sale under the same conditions and in the same manner as mortgagors are authorized to make application for registration.

SEC. 20. The application may be filed with the clerk of the Court of Land Registration, or with the register of deeds of the province or city in which the land or any portion thereof lies. Upon filing his application the applicant shall forthwith cause to be filed with the register of deeds for said city or province a memorandum stating that application for registration has been filed, and the date and place of filing, and a copy of the description of the land contained in the application. This memorandum shall be recorded and indexed by the register with the records of deeds. Each register of deeds shall also keep an index of all applications in his province or city, and, in every case where the application is filed with him, shall transmit the same, with the papers and plans filed therewith, and such memorandum when recorded, to the clerk of the Court of Land Registration.

SEC. 21. (*As amended by Acts Nos. 809 and 1108.*) The application shall be in writing, signed and sworn to by the applicant, or by some person duly authorized in his behalf. All oaths required by this Act may be administered by any officer authorized to administer oaths in the Philippine Islands. If there is more than one applicant, the application shall be signed and sworn to by and in behalf of each. It shall contain a description of the land and shall state whether the applicant is married; and, if married, the name of the wife or husband; and, if unmarried, whether he or she has been married, and, if so, when and how the married relation terminated. If by divorce, when, where, and by what court the divorce was granted. It shall also state the name in

full and the address of the applicant, and also the names and addresses of all occupants of the land and of all adjoining owners, if known; and, if not known, it shall state what search has been made to find them. It may be in form as follows:

UNITED STATES OF AMERICA, PHILIPPINE ISLANDS.

To the Honorable Judge of the Court of Land Registration:

I (or we), the undersigned, hereby apply to have the land hereinafter described brought under the operations of the Land Registration Act, and to have my (or our) title therein registered and confirmed. And I (or we) declare: (1) That I am (or we are) the owner (or owners) in fee simple (or by possessory information title) of a certain parcel of land with the buildings (if any; if not, strike out the words "with the buildings"), situated in (here insert accurate description). (2) That said land at the last assessment for taxation was assessed at ----- dollars; and the buildings (if any) at ----- dollars. (3) That I (or we) do not know of any mortgage or incumbrance affecting said land, or that any other person has any estate or interest therein, legal or equitable, in possession, remainder, reversion, or expectancy (if any, add "other than as follows," and set forth each clearly). (4) That I (or we) obtained title (if by deed, state name of grantor, date and place of record, and file the deed or state reason for not filing. If in any other way, state it). (5) That said land is ----- occupied (if occupied, state name in full and place of residence and post-office address of occupant and the nature of his occupancy. If unoccupied, insert "not"). (6) That the names and addresses so far as known to me (or us) of the owners of all lands adjoining the above land are as follows (same directions as above). (7) That I am (or we are) married. (Follow literally the directions given in the prior portions of this section.) (8) That my (or our) full name (or names), residence and post-office address is (or are) as follows:

Dated this ----- day of ----- in the year nineteen hundred and -----
(Signature)-----

(Schedule of documents.)

UNITED STATES OF AMERICA, PHILIPPINE ISLANDS.

Province (or city) of ----- (date).

Then personally appeared the above-named ----- known to me to be the signer (or signers) of the foregoing application, and made oath that the statements therein, so far as made of his (or their) own knowledge, are true, and so far as made upon information and belief, that he (or they) believe them to be true. The cedula certificate... of the applicant (or applicants, or representative) was exhibited to me, being No. -----, issued at -----, dated -----, 19--

Before me,

(Notary public or other official authorized to administer oaths.)

Sec. 22. If the applicant is not a resident of the Philippine Islands, he shall file with his application a paper appointing an agent residing in the Philippine Islands, giving his name in full, and his post-office address, and shall therein agree that the service of any legal process in proceedings under or growing out of the application shall be of the same legal effect if served upon the agent as if upon the applicant if within the Philippine Islands. If the agent dies or becomes insane, or removes from the Philippine Islands, the applicant shall at once make another appointment; and if he fails to do so, the court may dismiss the application.

Sec. 23. Amendments to the application, including joinder, substitution, or discontinuing as to parties, shall be allowed by the court at any time upon terms that are just and reasonable. But all amendments shall be in writing, signed and sworn to like the original.

Sec. 24. (*As amended by Act No. 1108.*) The application may include two or more contiguous parcels of land, or two or more parcels constituting one holding under one and the same title, if within the same province or city, and like

wise two or more parcels constituting one holding and within the same province or city, though not under one and the same title, nor contiguous, in cases where neither of the several parcels of land included in the one application exceeds one hundred dollars in value. But two or more persons claiming in the same parcels different interests, which, collectively, make up the legal estate in fee simple in each parcel, shall not join in one application for more than one parcel, unless their interests are alike in each and every parcel. The court may at any time order an application to be amended by striking out one or more parcels, or by severance of the application.

SEC. 25. If the application described the land as bounded on a public or private way or road, it shall state whether or not the applicant claims any and what land within the limits of the way or road, and whether the applicant desires to have the line of the way or road determined.

SEC. 26. The applicant shall file with the application a plan of the land, and all original muniments of title within his control mentioned in the schedule of documents, such original muniments to be produced before the examiner or the court at the hearing when required. When an application is dismissed or discontinued, the applicant may, with the consent of the court, withdraw such original muniments of title.

SEC. 27. When an application is made subject to an existing recorded mortgage, the holder of which has consented thereto, or to a recorded lease, or when the registration is to be made subject to such mortgage or lease executed after the time of the application and before the date of the transcription of the decree, the applicant shall, if required by the court, file a certified copy of such mortgage or lease, and shall cause the original, or, in the discretion of the court, a certified copy thereof to be presented for registration before the decree of registration is entered, and no registration fee shall be charged for registering such original mortgage or lease or such certified copy.

SEC. 28. The court may by general rule require facts to be stated in the application in addition to those prescribed by this Act, and not inconsistent therewith, and may require the filing of any additional papers.

SEC. 29. After the filing of the application and before registration the land therein described may be dealt with and instruments relating thereto shall be recorded, in the same manner as if no application had been made; but all instruments left for record relating to such land shall be indexed in the usual manner in the registry index and also in the index of applications. As soon as an application is disposed of, the clerk of the Court of Land Registration shall make a memorandum stating the disposition of the case and shall send the same to the register of deeds for the proper province or city, who shall record and index it with the records of deeds and in the index of applications. If the proceedings upon the application end in a decree of registration of title, the land included therein shall, as soon as said decree is transcribed, as hereinafter provided in section forty-one, become registered land, and thereafter no deeds or other instruments relating solely to such land shall be recorded with the records of deeds, but shall be registered in the registration book and filed and indexed with records and documents relating to registered lands.

SEC. 30. (*As amended by Acts Nos. 1648 and 1699.*) If the application is filed with the clerk, he shall forthwith forward it by registered mail to the register of deeds of the province or city in which the land or any portion thereof lies. Immediately upon the receipt of the application, whether from the applicant or the clerk, the register of deeds shall search the books and records of his office and attach to the application a certificate stating that the land to which the application relates does not appear in such books or records, or setting forth copies of all entries of such land, as the fact may be, and shall transmit the application, such certificate, and the papers, plans, and memorandum mentioned in section twenty of this Act by the first registered mail to the clerk in Manila.

SEC. 31. (*As amended by Acts Nos. 1648 and 1678.*) Upon receipt of the application, certificate, and accompanying papers from the register of deeds, the clerk shall cause notice of the filing of the application to be published twice, in successive issues of the Official Gazette, in both the English and the Spanish languages. The notice shall be issued by order of the court, attested by the clerk and shall be in form substantially as follows:

* REGISTRATION OF TITLE.

PROVINCE (OR CITY) OF -----

COURT OF LAND REGISTRATION.

To [here insert the names of all persons appearing to have an interest and the adjoining owners so far as known], and to all whom it may concern:

Whereas an application has been presented to said court by [name or names, and addresses in full] to register and confirm his (or their) title in the following described lands [insert description], you are hereby cited to appear at the Court of Land Registration, to be held at -----, in said Province (or city) of -----, on the ----- day of -----,

A. D., nineteen hundred and -----, at ----- o'clock in the forenoon, to show cause, if any you have, why the prayer of said application shall not be granted. And unless you appear at such court, at the time and place aforesaid, your default will be recorded and the said application will be taken as confessed, and you will be forever barred from contesting said application or any decree entered thereon.

Witness: -----, Judge of said court, this ----- day of -----, in the year nineteen hundred and -----

Attest:

Clerk of said Court.

SEC. 32. (*As amended by Act No. 809.*) The return of said notice shall not be less than twenty nor more than sixty days from date of issue. The court shall also, within seven days after publication of said notice in the newspapers, as hereinbefore provided, cause a copy of the notice in Spanish to be mailed by the clerk to every person named therein whose address is known. The court shall also cause a duly attested copy of the notice to be posted, in the Spanish language, in a conspicuous place on each parcel of land included in the application, and also in a conspicuous place upon the chief municipal building of the pueblo in which the land or a portion thereof is situate, by the governor or sheriff of the province or city, as the case may be, or by his deputy, fourteen days at least before the return day thereof, and his return shall be conclusive proof of such service. If the applicant requests to have the line of a public way determined, the court shall order a notice to be given by the clerk by mailing a registered letter to the president of the municipal council, or to the Municipal Board, as the case may be, of the municipality or city in which the land lies. If the land borders on a river, navigable stream, or shore, or on an arm of the sea where a river or harbor line has been established, or on a lake, or if it otherwise appears from the application or the proceedings that the Insular Government may have a claim adverse to that of the applicant, notice shall be given in the same manner to the Attorney-General. The court may also cause other or further notice of the application to be given in such manner and to such persons as it may deem proper. The court shall, so far as it deems it possible, require proof of actual notice to all adjoining owners and to all persons who appear to have interest in or claim to the land included in the application. Notice to such persons by mail shall be by registered letter if practicable. The certificate of the clerk that he has served the notice as directed by the court, by publishing or mailing, shall be filed in the case before the return day, and shall be conclusive proof of such service.

SEC. 33. Upon the return day of the notice, and proof of service of all orders of notice issued, the court may appoint a disinterested person to act as guardian *ad litem* for minors and persons *not in being*, unascertained, unknown, or out of the Philippine Islands, who may have an interest. The compensation of the guardian or agent shall be determined by the court and paid as part of the expenses of the court.

SEC. 34. Any person claiming an interest, whether named in the notice or not, may appear and file answer on or before the return day, or within such further time as may be allowed by the court. The answer shall state all the objections to the application, and shall set forth the interest claimed by the

* NOTE:

[Act No. 1648.]

SEC. 2. The publication in the Official Gazette of the notice provided for in section one of this Act shall be in lieu of the publication thereof in the newspapers as heretofore provided, and all Acts and parts of Acts in conflict with this Act are hereby repealed.

party filing the same, and shall be signed and sworn to by him or by some person in his behalf.

SEC. 35. (*As amended by Act No. 1699.*) If no person appears and answers within the time allowed, the court may at once upon motion of the applicant, no reason to the contrary appearing, order a general default to be recorded and the application to be taken for confessed. By the description in the notice, 'To all whom it may concern,' all the world are made parties defendant and shall be concluded by the default and order. After such default and order the court may enter a decree confirming the title of the applicant and ordering registration of the same.

SEC. 36. (*As amended by Acts Nos. 1108 and 1699.*) If in any case an appearance is entered and answer filed, the case shall be set down for hearing on motion of either party, but a default and order shall be entered against all persons who do not appear and answer, in the manner provided in the preceding section. The court may hear the parties and their evidence or may refer the case or any part thereof to a referee, to hear the parties and their evidence and make report thereon to the court. The trial before the referee may occur at any convenient place within the province or city, and the time and place of trial shall be fixed by the referee and reasonable notice thereof shall be given by him to the parties. The court shall render judgment in accordance with the report as though the facts had been found by the judge himself, unless the court shall for cause shown set the report aside or order it to be recommitted to the referee for further finding: *Provided, nevertheless,* That the court may in its discretion accept the report in part or set it aside in part. The court may in any case before decree require a survey to be made for the purpose of determining boundaries, and may order durable bounds to be set, and referred to in the application, by amendment. The expense of survey and bounds shall be taxed in the costs of the case and may be apportioned among the parties as justice may require. If no person appears to oppose the application, such expense shall be borne by the applicant. If two or more applications claim the same land, or part of the same land, the court may order the hearings upon all such applications to be consolidated, if such consolidation is in the interest of economy of time and expense.

The surveying required by the provisions of this section, or by any rules and directions of the Court of Land Registration, and the drafting of any plans required, may be done by any private surveyor of sufficient qualifications, to be approved by the judges of the Court of Land Registration, or by a surveyor or surveyors to be detailed for that purpose from the clerical force authorized by law for the Court of Land Registration, whose duty it is hereby made to provide in its clerical force a sufficient number of competent surveyors for the purpose of carrying out the provisions of this section. The judges of the Court of Land Registration shall fix in each case the fee to be charged by the expense of a survey and necessary drafting, which shall be paid by the applicant, or apportioned among the parties, as justice may require. The fees so charged shall be paid into the Insular Treasury, except in cases where a private surveyor, to be approved by the judges, is employed.

SEC. 37. If in any case the court finds that the applicant has not proper title for registration, a decree shall be entered dismissing the application, and such decree may be ordered to be without prejudice. The applicant may withdraw his application at any time before final decree, upon terms to be fixed by the court.

SEC. 38. If the court after hearing finds that the applicant has title as stated in his application, and proper for registration, a decree of confirmation and registration shall be entered. Every decree of registration shall bind the land, and quiet title thereto, subject only to the exceptions stated in the following section. It shall be conclusive upon and against all persons, including the Insular Government and all the branches thereof, whether mentioned by name in the application, notice, or citation, or included in the general description "To all whom it may concern." Such decree shall not be opened by reason of the absence, infancy, or other disability of any person affected thereby, nor by any proceeding in any court for reversing judgments or decrees; subject, however, to the right of any person deprived of land or of any estate or interest therein by decree of registration obtained by fraud to file in the Court of Land Registration a petition for review within one year after entry of the decree, provided no innocent purchaser for value has acquired an interest. If there is any such purchaser, the decree of registration shall not be opened, but shall remain in full force and effect forever, subject only to the right of appeal here-

inbefore provided. But any person aggrieved by such decree in any case may pursue his remedy by action for damages against the applicant or any other person for fraud in procuring the decree. Whenever the phrase "innocent purchaser for value" or an equivalent phrase occurs in this Act, it shall be deemed to include an innocent lessee, mortgagee, or other encumbrancer for value.

SEC. 39. Every applicant receiving a certificate of title in pursuance of a decree of registration, and every subsequent purchaser of registered land who takes a certificate of title for value in good faith, shall hold the same free of all incumbrance except those noted on said certificate, and any of the following incumbrances which may be subsisting, namely:

First. Liens, claims, or rights arising or existing under the laws or Constitution of the United States or of the Philippine Islands which the statutes of the Philippine Islands can not require to appear of record in the registry.

Second. Taxes within two years after the same have become due and payable.

Third. Any public highway, way, or private way established by law, where the certificate of title does not state that the boundaries of such highway or way have been determined. But if there are easements or other rights appurtenant to a parcel of registered land which for any reason have failed to be registered, such easements or rights shall remain so appurtenant notwithstanding such failure, and shall be held to pass with the land until cut off or extinguished by the registration of the servient estate, or in any other manner.

SEC. 40. Every decree of registration shall bear the day of the year, hour, and minute of its entry, and shall be signed by the clerk. It shall state whether the owner is married or unmarried, and if married, the name of the husband or wife. If the owner is under disability, it shall state the nature of the disability, and if a minor, shall state his age. It shall contain a description of the land as finally determined by the court, and shall set forth the estate of the owner, and also, in such manner as to show their relative priority, all particular estates, mortgages, easements, liens, attachments, and other incumbrances, including rights of husband or wife, if any, to which the land or owner's estate is subject, and may contain any other matter properly to be determined in pursuance of this Act. The decree shall be stated in a convenient form for transcription upon the certificates of title hereinafter mentioned.

SEC. 41. Immediately upon the entry of the decree of registration the clerk shall send a certified copy thereof, under the seal of the court, to the register of deeds for the province, or provinces, or city in which the land lies, and the register of deeds shall transcribe the decree in a book to be called the "Registration Book," in which a leaf, or leaves, in consecutive order shall be devoted exclusively to each title. The entry made by the register of deeds in this book in each case shall be the original certificate of title, and shall be signed by him and sealed with the seal of the court. All certificates of title shall be numbered consecutively, beginning with number one. The register of deeds shall in each case make an exact duplicate of the original certificate, including the seal, but putting on it the words "Owner's duplicate certificate," and deliver the same to the owner, or to his attorney duly authorized. In case of a variance between the owner's duplicate certificate and the original certificate the original shall prevail. The certified copy of the decree of registration shall be filed and numbered by the register of deeds with a reference noted on it to the place of record of the original certificate of title: *Provided, however,* That when an application includes land lying in more than one province, or one province and the city of Manila, the court shall cause the part lying in each province or in the city of Manila to be described separately by metes and bounds in the decree of registration, and the clerk shall send to the register of deeds for each province, or the city of Manila, as the case may be, a copy of the decree containing a description of the land within that province or city, and the register of deeds shall register the same and issue an owner's duplicate therefor, and thereafter for all matters pertaining to registration under this Act the portion in each province or city shall be treated as a separate parcel of land.

SEC. 42. The certificate first registered in pursuance of the decree of registration in regard to any parcel of land shall be entitled in the registration book, "Original certificate of title, entered pursuant to decree of the Court of Land Registration, dated at" (stating time and place of entry of decree and the number of case). This certificate shall take effect upon the date of the

transcription of the decree. Subsequent certificates relating to the same land shall be in like form, but shall be entitled "Transfer from number" (the number of the next previous certificate relating to the same land), and also the words "Originally registered" (date, volume, and page of registration).

SEC. 43. Where two or more persons are registered owners, as tenants in common, or otherwise, one owner's duplicate certificate may be issued for the whole land, or a separate duplicate may be issued to each for his undivided share.

SEC. 44. A registered owner holding one duplicate certificate for several distinct parcels of land may surrender it, with the approval of the court, and take out several certificates for portions thereof. So a registered owner holding separate certificates for several distinct parcels may surrender them, and, with like approval, take out a single duplicate certificate for the whole land, or several certificates for the different portions thereof. Any owner subdividing a tract of registered land into lots shall file with the clerk a plan of such land, when applying for a new certificate or certificates, and the court, before issuing the same shall cause the plan to be verified and require that all boundaries, streets, and passageways shall be distinctly and accurately delineated thereon.

SEC. 45. The obtaining of a decree of registration and the entry of a certificate of title shall be regarded as an agreement running with the land, and binding upon the applicant and all successors in title that the land shall be and always remain registered land, and subject to the provisions of this Act and all Acts amendatory thereof.

SEC. 46. No title to registered land in derogation to that of the registered owner shall be acquired by prescription or adverse possession.

SEC. 47. The original certificate in the registration book, any copy thereof duly certified under the signature of the clerk, or of the register of deeds of the province or city where the land is situate, and the seal of the court, and also the owner's duplicate certificate, shall be received as evidence in all the courts of the Philippine Islands and shall be conclusive as to all matters contained therein except so far as otherwise provided in this Act.

SEC. 48. Every certificate of title shall set forth the names of all the persons interested in the estate in fee simple in the whole land and duplicate certificates may be issued to each person, but the clerk or register of deeds, as the case may be, shall note in the registration book, and upon each certificate, to whom such duplicate was issued.

SEC. 49. The clerk, under direction of the court, shall make and keep indexes of all applications, of all decrees of registration, and shall also index and classify all papers and instruments filed in his office relating to applications and to registered titles. He shall also, under direction of the court, cause forms of index and registration and entry books to be prepared for use of the registers of deeds. The court shall prepare and adopt convenient forms of certificates of title, and shall also adopt general forms of memoranda to be used by registers of deeds in registering common forms of deeds of conveyance and other instruments, and to express briefly their effect.

VOLUNTARY DEALING WITH LAND AFTER ORIGINAL REGISTRATION.

SEC. 50. An owner of registered land may convey, mortgage, lease, charge, or otherwise deal with the same as fully as if it had not been registered. He may use forms of deeds, mortgages, leases, or other voluntary instruments like those now in use and sufficient in law for the purpose intended. But no deed, mortgage, lease, or other voluntary instrument, except a will, purporting to convey or affect registered land, shall take effect as a conveyance or bind the land, but shall operate only as a contract between the parties and as evidence of authority to the clerk or register of deeds to make registration. The act of registration shall be the operative act to convey and affect the land, and in all cases under this Act the registration shall be made in the office of register of deeds for the province or provinces or city where the land lies.

SEC. 51. Every conveyance, mortgage, lease, lien, attachment, order, decree, instrument, or entry affecting registered land which would under existing laws, if recorded, filed, or entered in the office of the register of deeds, affect the real estate to which it relates shall, if registered, filed, or entered in the office of the register of deeds in the province or city where the real estate to which such instrument relates lies, be notice to all persons from the time of such registering, filing, or entering.

SEC. 52. No new certificate shall be entered or issued upon any transfer of registered land which does not divest the land in fee simple from the owner or from some one of the registered owners. All interests in registered land less than an estate in fee simple shall be registered by filing with the register of deeds the instrument creating or transferring or claiming such interest and by a brief memorandum thereof made by the register of deeds upon the certificate of title, signed by him. A similar memorandum shall also be made on the owner's duplicate. The cancellation or extinguishment of such interests shall be registered in the same manner.

SEC. 53. Where the register of deeds is in doubt upon any question of law, or where any party in interest does not agree as to the proper memorandum to be made in pursuance of any deed, mortgage, or other voluntary instrument presented for registration, the question shall be referred to the court for decision, either on the certificate of the register of deeds stating the question upon which he is in doubt or upon the suggestion in writing of any party in interest; and the court, after notice to all parties and hearing, shall enter an order prescribing the form of memorandum to the register of deeds to make registration in accordance therewith.

SEC. 54. Every deed or other voluntary instrument presented for registration shall contain or have indorsed upon it the full name, place of residence, and post-office address of the grantee or other person acquiring or claiming such interest under such instrument, and every such instrument shall also state whether the grantee is married or unmarried, and, if married, give the name in full of the husband or wife. Any change in the residence or post-office address of such person shall be indorsed by the register of deeds on the original instrument, on receiving a sworn statement of such change. All names and addresses shall also be entered upon all certificates. Notices and process in relation to registered land in pursuance of this Act may be served upon any person in interest by mailing the same to the address so given, and shall be binding whether such person resides within or without the Philippine Islands, but the court may, in its discretion, require further or other notice to be given in any case, if in its opinion the interests of justice so require.

SEC. 55. No new certificate of title shall be entered, no memorandum shall be made upon any certificate of title by the clerk, or by any register of deeds, in pursuance of any deed or other voluntary instrument, unless the owner's duplicate certificate is presented for such indorsement, except in cases expressly provided for in this Act, or upon the order of the court, for cause shown; and whenever such order is made a memorandum thereof shall be entered upon the new certificate of title and upon the owner's duplicate.

The production of the owner's duplicate certificate whenever any voluntary instrument is presented for registration shall be conclusive authority from the registered owner to the clerk or register of deeds to enter a new certificate or to make a memorandum of registration in accordance with such instrument, and the new certificate or memorandum shall be binding upon the registered owner and upon all persons claiming under him, in favor of every purchaser for value and in good faith: *Provided, however*, That in all cases of registration procured by fraud the owner may pursue all his legal and equitable remedies against the parties to such fraud, without prejudice, however, to the rights of any innocent holder for value of a certificate of title: *And provided further*, That after the transcription of the decree of registration on the original application, any subsequent registration under this Act procured by the presentation of a forged duplicate certificate, or of a forged deed or other instrument, shall be null and void. In case of the loss or theft of an owner's duplicate certificate, notice shall be sent by the owner or by some one in his behalf to the register of deeds of the province in which the land lies, as soon as the loss or theft is discovered.

SEC. 56. Each register of deeds shall keep an entry book in which he shall enter in the order of their reception all deeds and other voluntary instruments, and all copies of writs or other process filed with him relating to registered land. He shall note in such book the year, month, day, hour, and minute of reception of all instruments, in the order in which they are received. They shall be regarded as registered from the time so noted, and the memorandum of each instrument when made on the certificate of title to which it refers shall bear the same date.

Every deed or other instrument, whether voluntary or involuntary, so filed with the clerk or register of deeds shall be numbered and indexed, and indorsed

with a reference to the proper certificate of title. All records and papers relating to registered land in the office of the clerk or of any register of deeds shall be open to the public, subject to such reasonable regulations as the clerk, under the direction of the court, may make.

Duplicates of all deeds and voluntary instruments filed and registered may be presented with the originals, and shall be attested and sealed by the clerk or the register of deeds, and indorsed with the file number and other memoranda on the originals, and may be taken away by the person presenting the same.

Certified copies of all instruments filed and registered may also be obtained at any time, upon the payment of the fees of the register of deeds.

CONVEYANCE IN FEE.

SEC. 57. An owner desiring to convey in fee his registered land or any portion thereof shall execute a deed of conveyance, which the grantor or grantee may present to the register of deeds in the province where the land lies. The grantor's duplicate certificate shall be produced and presented at the same time. The register of deeds shall thereupon, in accordance with the rules and instructions of the court, make out in the registration book a new certificate of title to the grantee, and shall prepare and deliver to him an owner's duplicate certificate. The register of deeds shall note upon the original and duplicate certificates the date of transfer, the volume and page of the registration book where the new certificate is registered, and a reference by number to the last prior certificate. The grantor's duplicate certificate shall be surrendered, and the word "canceled" stamped upon it. The original certificate shall also be stamped "canceled." The deed of conveyance shall be filed and indorsed with the number and place of registration of the certificate of title of the land conveyed.

SEC. 58. When a deed in fee is for a part only of the land described in a certificate of title, the register of deeds shall also enter a new certificate and issue an owner's duplicate to the grantor for the part of the land not included in the deed. In every case of transfer the new certificate or certificates shall include all the land described in the original and surrendered certificates: *Provided, however,* That no new certificate to a grantee of a part only of the land shall be invalid by reason of the failure of the register of deeds to enter a new certificate to the grantor for the remaining unconveyed portion: *And provided further,* That in case the land described in a certificate of title is divided into lots, designated by numbers or letters, with measurements of all the bounds, and a plan of said land has been filed with the clerk and verified pursuant to section forty-four of this Act, and a certified copy thereof is recorded in the registration book with the original certificate, when the original owner makes a deed of transfer in fee of one or more of such lots, the register of deeds may, instead of canceling such certificate and entering a new certificate to the grantor for the part of the land not included in the deed of transfer, enter on the original certificate and on the owner's duplicate certificate a memorandum of such deed of transfer, with a reference to the lot or lots thereby conveyed as designated on such plan, and that the certificate is canceled as to such lot or lots; and every certificate with such memorandum shall be effectual for the purpose of showing the grantor's title to the remainder of the land not conveyed as if the old certificate had been canceled and a new certificate of such land had been entered; and such process may be repeated so long as there is convenient space upon the original certificate and the owner's duplicate certificate for making such memorandum of sale of lots.

SEC. 59. If at the time of any transfer there appear upon the registration book incumbrances or claims adverse to the title of the registered owner, they shall be stated in the new certificate or certificates, except so far as they may be simultaneously released or discharged.

MORTGAGES.

SEC. 60. The owner of registered land may mortgage the same by executing a mortgage deed, and such deed may be assigned, extended, discharged, released in whole or in part, or otherwise dealt with by the mortgagee by any form of deed or instrument sufficient in law for the purpose. But such mortgage deed, and all instruments assigning, extending, discharging, and otherwise dealing with the mortgage, shall be registered, and shall take effect upon the title only from the time of registration.

SEC. 61. Registration of a mortgage shall be made in the manner following, to wit: The owner's duplicate certificate shall be presented to the register of deeds with the mortgage deed, and he shall enter upon the original certificate of title and also upon the owner's duplicate certificate a memorandum of the purport of the mortgage deed, the time of filing and the file number of the deed, and shall sign the memorandum. He shall also note upon the mortgage deed the time of filing and a reference to the volume and page of the registration book where it is registered.

The register of deeds shall also, at the request of the mortgagee, make out and deliver to him a duplicate of the certificate of title, like the owner's duplicate, except that the words "mortgagee's duplicate" shall be stamped upon it in large letters diagonally across its face. A memorandum of the issue of the mortgagee's duplicate shall be made upon the original certificate of title.

SEC. 62. Whenever a mortgage upon which a mortgagee's duplicate has been issued is assigned, extended, or otherwise dealt with, the mortgagee's duplicate shall be presented with the instrument assigning, extending, or otherwise dealing with the mortgage, and a memorandum of the instrument shall be made upon the mortgagee's duplicate certificate. When the mortgage is discharged or otherwise extinguished the mortgagee's duplicate certificate shall be surrendered and stamped "canceled." The production of the mortgagee's duplicate certificate shall be conclusive authority to register the instrument therewith presented, subject, however, to all the provisions and exceptions contained in section fifty-five of this Act so far as the same are applicable.

A mortgage on registered land may also be discharged, by the mortgagee in person, on the registration book, by indorsing upon the original certificate of title and upon the owner's duplicate certificate a memorandum stating that the mortgage has been satisfied and is discharged, together with the date of such entry, signed by the mortgagee, and such discharge shall be attested by the register of deeds, the mortgagee's duplicate certificate being at the same time surrendered and stamped "canceled."

SEC. 63. Mortgages of registered land may be foreclosed in the manner provided in the Code of Procedure in Civil Actions and Special Proceedings.^a A certified copy of the final decree of the court confirming the sale under foreclosure proceedings may be filed with the register of deeds after the time for appealing therefrom has expired, and the purchaser shall thereupon be entitled to the entry of a new certificate and to the issuance of a new owner's duplicate certificate, a memorandum thereof being at the same time likewise indorsed upon the mortgagor's original certificate and the mortgagee's duplicate, if any, being first delivered up and canceled: *Provided, however,* That nothing contained in this Act shall be construed to prevent the mortgagor or other person interested from directly impeaching by any proper legal proceedings any foreclosure proceedings affecting registered land, prior to the entry of a new certificate of title.

LEASES.

SEC. 64. Leases of registered land shall be registered in the manner provided in section fifty-two of this Act, in lieu of recording. A lessee's duplicate certificate may be issued to the lessee upon his request, subject to the provisions hereinbefore made in regard to a mortgagee's duplicate certificate, so far as the same are applicable.

TRUSTS.

SEC. 65. Whenever a deed or other instrument is filed for the purpose of transferring registered land in trust, or upon any equitable condition or limitation expressed therein, or for the purpose of creating or declaring a trust or other equitable interest in such land without transfer, the particulars of the trust, condition, limitation, or other equitable interest shall not be entered on the certificate; but a memorandum thereof shall be entered by the words "in trust," or "upon condition," or other apt words, and by a reference by number to the instrument authorizing or creating the same. A similar memorandum shall be made upon the duplicate certificate. The register of deeds shall note upon the original instrument creating or declaring the trust or other equitable interest a reference by number to the certificate of title to which it relates, and to the volume and page in the registration book where it is registered. If the instrument creating or declaring a trust or other equitable interest is already recorded in the land register of the Philippine Islands, a certified copy may be filed by the register of deeds and registered.

SEC. 66. If the instrument creating or declaring a trust or other equitable interest contains an express power to sell, mortgage, or deal with the land in any manner, such power shall be stated in the certificate of title by the words "with power to sell," or "with power to mortgage," and by apt words of description in case of other powers. No instrument transferring, mortgaging, or in any way dealing with registered land held in trust shall be registered, unless the power thereto enabling is expressly conferred in the instrument of trust, or unless the decree of a court of competent jurisdiction has construed the instrument in favor of such power, in which case a certified copy of such decree may be filed with the register of deeds, and he shall make registration in accordance therewith.

SEC. 67. When a new trustee of registered land is appointed by a court of competent jurisdiction, a new certificate shall be entered to him upon presentation to the register of deeds of a certified copy of the decree and the surrender and cancellation of the duplicate certificate.

SEC. 68. Whoever claims an interest in registered land by reason of any implied or constructive trust shall file for registration a statement thereof with the register of deeds. The statement shall contain a description of the land, and a reference to the number of the certificate of title and the volume and page of the registration book where it is entered. Such claim shall not affect the title of a purchaser for value and in good faith before its registration.

SEC. 69. Any trustee shall have authority to file an application for registration of any land held in trust by him, unless expressly prohibited by the instrument creating the trust.

LEGAL INCIDENTS OF REGISTERED LAND.

SEC. 70. Registered land, and ownership therein, shall in all respects be subject to the same burdens and incidents attached by law to unregistered land. Nothing contained in this Act shall, in any way be construed to relieve registered land or the owners thereof from any rights incident to the relation of husband and wife, or from liability to attachment on mesne process or levy on execution, or from liability to any lien of any description established by law on land and the buildings thereon, or the interest of the owner in such land or buildings, or to change the laws of descent, or the rights of partition between coparceners, joint tenants and other cotenants, or the right to take the same by eminent domain, or to relieve such land from liability to be appropriated in any lawful manner for the payment of debts, or to change or affect in any other way any other rights or liabilities created by law and applicable to unregistered land, except as otherwise expressly provided in this Act or in the amendments hereof.

ATTACHMENTS AND OTHER LIENS.

SEC. 71. In every case where a writing of any description or a copy of any writ is required by law to be filed or recorded in the registry of deeds in order to create or preserve any lien, right, or attachment upon unregistered land, such writing or copy when intended to affect registered land, in lieu of recording, shall be filed and registered in the office of the register of deeds for the province in which the land lies, and, in addition to any particulars required in such papers for recording with records of deeds, shall also contain a reference to the number of the certificate of title of the land to be affected, and the volume and page in the registration book where the certificate is registered, and also, if the attachment, right, or lien is not claimed on all the land in any certificate of title, a description sufficiently accurate for identification, of the land intended to be affected.

SEC. 72. In every case where an attachment or other lien or adverse claim of any description is registered, and the duplicate certificate is not presented at the time of registration to the register of deeds, he shall within twenty-four hours thereafter send notice by mail to the registered owner, stating that such paper has been registered, and requesting him to send or produce the duplicate certificate in order that a memorandum of the attachment or other lien or adverse claim shall be made thereon. If the owner neglects or refuses to comply within a reasonable time, the register of deeds shall suggest the fact to the court, and the court, after notice, shall enter an order to the owner to produce his certificate at a time and place to be named therein, and may enforce the order by suitable process.

SEC. 73. Attachment on mesne process and liens of every description upon registered land shall be continued, reduced, discharged, and dissolved by any method sufficient in law to continue, reduce, discharge, or dissolve like liens on unregistered land. All certificates or other instruments which are permitted or required by law to be recorded in the registry of deeds to give effect to the continuance, reduction, discharge, or dissolution of attachments or other liens on unregistered lands, or to give notice of such continuance, reduction, discharge, or dissolution, shall in the case of like liens on registered land be filed with the register of deeds and registered in the registration book, in lieu of recording.

SEC. 74. All the provisions of law now in force relating to attachments of real estate and leasehold estates on mesne process shall apply to registered land, except that the duties required to be performed by the present recording officer shall be performed by the register of deeds for the province where the land lies, who, in lieu of recording, shall register the facts heretofore required to be recorded, and for that purpose shall keep suitable books.

SEC. 75. The name and address of the plaintiff's lawyer shall in all cases be indorsed on the writ or process where an attachment is made, and he shall be deemed to be the attorney of the plaintiff until written notice that he has ceased to be such shall be filed for registration by the plaintiff.

SEC. 76. Whenever an attachment on mesne process is continued, reduced, dissolved, or otherwise affected by an order, decision, or judgment of the court in which the action or proceeding in which said attachment was made is pending, or by the order of any judge or court having jurisdiction thereof, a certificate of the entry of such order, decision, or judgment from the clerk of the court or judge by which such order, decision, or judgment has been rendered and under the seal of the court or judge, shall be entitled to be registered on presentation to the register of deeds.

SEC. 77. A lien of any description on registered land shall be enforced in the same manner as like liens upon unregistered land. Whenever registered land is sold on execution, or taken or sold for taxes or for any assessment, or to enforce a lien of any character, or for any costs and charges incident to such liens, any execution, or copy of execution, any officer's return, or any deed, demand, certificate, or affidavit, or other instrument made in the course of proceedings to enforce such liens and required by law to be recorded in the registry of deeds in the case of unregistered land, shall be filed with the register of deeds for the province where the land lies and registered in the registration book, and a memorandum made upon the proper certificate of title, in each case, as an adverse claim or incumbrance.

SEC. 78. Upon the expiration of the time, if any, allowed by law for redemption after registered land has been sold on any execution, or taken or sold for the enforcement of any lien of any description, the person claiming under the execution or under any deed or other instrument made in the course of proceedings to levy such execution or enforce any lien, may petition the court for the entry of a new certificate to him, and the application may be granted: *Provided, however*, That every new certificate entered under this section shall contain a memorandum of the nature of the proceeding on which it is based: *Provided further*, That at any time prior to the entry of a new certificate the registered owner may pursue all his lawful remedies to impeach or annul proceedings under executions or to enforce liens of any description.

PENDING SUITS, JUDGMENTS, DECREES, AND PARTITIONS.

SEC. 79. No action to recover possession of real estate, or to quiet the title thereto, or to remove clouds upon the title thereof, or for partition or other proceeding of any kind in court affecting the title to real estate or the use and occupation thereof or the buildings thereon, and no judgment or decree, and no proceeding to vacate or reverse any judgment or decree, shall have any effect upon registered land as against persons other than the parties thereto, unless a memorandum stating the institution of such action or proceeding and the court wherein the same is pending, and the date of the institution thereof, containing also a reference to the number of the certificate of title of the land affected, and the volume and page of the registration book where it is entered, shall be filed and registered. This section shall not apply to attachments, levies of execution, or to proceedings for the probate of wills, or for administration of the estates of deceased persons in the Court of First Instance: *Provided, however*, That in case notice of the pendency of the action has been duly regis-

tered it shall be sufficient to register the judgment or decree in such action within sixty days after the rendition thereof.

SEC. 80. At any time after final judgment or decree in favor of the defendant, or other disposition of the action such as to terminate finally all rights of the plaintiff in and to the land and buildings involved, in any case in which a memorandum has been registered as provided in the preceding section, a certificate of the clerk of the court in which the action or proceeding was pending stating the manner of disposal thereof shall be entitled to registration.

SEC. 81. Whenever in any action to recover the possession or ownership of real estate or any interest therein affecting registered land judgment is entered for the plaintiff, such judgment shall be entitled to registration on presentation of a certificate of the entry thereof from the clerk of the court where the action is pending to the register of deeds for the province where the land lies, who shall enter a memorandum upon the certificate of title of the land to which such judgment relates. If the judgment does not apply to all the land described in the certificate of title, the certificate of the clerk of the court where the action is pending and the memorandum entered by the register of deeds shall contain a description of the land affected by the judgment.

SEC. 82. When in any action to recover the possession or title of real estate or an interest therein execution has been issued directing the officer to place the plaintiff in possession of the land affected by the judgment on which the execution was issued, the officer shall cause an attested copy of the execution, with a return of his doings thereon, to be filed and registered within three months after the service, and before the return of the execution into the office of the clerk whence it issued, and the plaintiff, in case the judgment was that he was entitled to an estate in fee simple in the demanded premises or in any part thereof, and for which execution issued, shall thereupon be entitled to the entry of a new certificate of title and to a cancellation of the certificate and owner's duplicate certificate of the former registered owner. If the former registered owner neglects or refuses within a reasonable time after request to produce his duplicate certificate in order that the same may be canceled, the court on application and after notice shall enter an order to the owner to produce his certificate at the time and place named therein, and may enforce the order by suitable process.

SEC. 83. Every court passing a judgment or decree in favor of the plaintiff affecting registered land shall, upon application of the plaintiff, order any parties before it to execute for registration any deed or instrument necessary to give effect to its judgment or decree, and may require the registered owner to deliver his duplicate certificate to the plaintiff to be canceled or to have a memorandum entered upon it by the register of deeds. In case the person required to execute any deed or other instrument necessary to give effect to the judgment or decree is absent from the Philippine Islands, or is a minor, or insane, or for any reason not amenable to the process of the court, the court passing the judgment or decree may appoint some suitable person a trustee to execute such instrument, and the same when executed shall be registered and shall have full force and effect to bind the land to be affected thereby.

SEC. 84. In all proceedings for partition of registered land, after the entry of the final judgment or decree of partition and the filing of the report of the committee or commissioners and final judgment thereon, a copy of the final judgment or decree, certified by the clerk of the court rendering the same, shall be filed and registered; and thereupon, in case the land is set off to the owners in severalty, any owner shall be entitled to have his certificate entered to the share set off to him in severalty, and to receive an owner's duplicate thereof. In case the land is ordered by the court to be sold, the purchaser or his assigns shall be entitled to have a certificate of title entered to him or to them on presenting the deed of the commissioners or committee for registration. In case the land is ordered by the court rendering the judgment to be set off in entirety to one of the parties upon payment to the other parties to the action, the party to whom the land is thus ordered to be set off shall be entitled to have a certificate of title entered to him on presenting a copy of the judgment or decree certified by the clerk of the court rendering the same: *Provided, however*, That any new certificate entered in pursuance of partition proceedings, whether by way of set-off or of assignment or of sale, shall contain a reference to the final judgment or decree or partition, and shall be conclusive as to the title to the same extent against the same person as such judgment or decree is made conclusive by the laws applicable thereto: *And provided, also*, That any person holding such certificates of title or transfer

thereof shall have the right to petition the court at any time to cancel the memorandum relating to such judgment or decree, and the court, after notice and hearing, may grant the application. Such certificate shall thereafter be conclusive in the same manner and in the same extent as other certificates of title.

SEC. 85. When a certified copy of a judgment or decree making final partition of land or buildings is presented for registration, if a mortgage or lease affecting a specific portion or an undivided share of the premises had previously been registered, the mortgagee, or tenant claiming under the mortgagor or lessor, shall cause the mortgage or lease and any duplicate certificate of title issued to the mortgagee or lessee to be again presented for registration, and the register of deeds shall indorse on each the memorandum of such partition, with a description of the land set off in severalty on which such mortgage or lease remains in force. Such mortgagee or tenant shall not be entitled to receive his own duplicate certificate of title until such mortgage or lease has been so presented for registration.

BANKRUPTCY, INSOLVENCY, AND ANALOGOUS PROCEEDINGS.

SEC. 86. Whenever proceedings in bankruptcy or insolvency, or analogous proceedings are instituted against a debtor who is an owner of registered land, it shall be the duty of the officer serving the notice of the institution of such proceedings on the debtor to file a copy thereof in the registry of deeds for the province wherein land of the debtor lies. The assignee or trustee appointed by the court having jurisdiction thereof in such proceedings shall be entitled to the entry of a new certificate of registered land of the debtor upon presenting and filing a certified copy of the order appointing him such assignee or trustee, with the debtor's duplicate certificate of title; the new certificate shall state that it is entered to him as assignee or trustee in insolvency or bankruptcy or other proceedings, as the case may be.

SEC. 87. Whenever proceedings of the character named in the preceding section against a registered owner, of which notice has been registered, are vacated by decree or judgment, a certified copy of the decree or judgment may be filed and registered. If a new certificate has been entered to the assignee or trustee as registered owner, the debtor shall be entitled to the entry of a new certificate to him, and the certificate of the assignee or trustee shall be surrendered.

EMINENT DOMAIN.^a

SEC. 88. Whenever any land of a registered owner, or any right or interest therein, is taken by eminent domain, the Government or municipality or corporation or other authority exercising such right shall file for registration in the proper province a description of the registered land so taken, giving the name of each owner thereof, referring by number and place of registration in the registration book to each certificate of title, and stating what amount or interest in the land is taken, and for what purpose. A memorandum of the right or interest taken shall be made on each certificate of title by the register of deeds, and where the fee simple is taken a new certificate shall be entered to the owner for the land remaining to him after such taking, and a new certificate shall be entered to the Government, municipality, corporation, or other authority exercising such right for the land so taken. All fees on account of any memorandum of registration or entry of new certificates shall be paid by the authority taking the land.

TRANSMISSION BY DESCENT AND DEVISE.

SEC. 89. Lands and any estate or interest therein registered under this Act shall, upon the death of the owner, go to the executor or administrator of the deceased in like manner as personal estate, whether the owner dies testate or intestate, and shall be subject to the same rules of administration as if the same were personalty, except as otherwise provided in this Act, and except that the rule of division shall be the same as in the descent of real property, or as shall be provided by will.

SEC. 90. Before the executor or administrator of a deceased owner of registered land or any estate, or interest therein, shall deal with the same, he shall file in the office of the register of deeds a certified copy of his letters of administration, or if there is a will, a certified copy of the same and of the letters testamentary, or of administration, with the will annexed, as the case may be,

and shall produce the duplicate certificate of title, and thereupon the register of deeds shall enter upon the certificate, and the duplicate certificate a memorandum thereof with a reference to the letters or will and letters by their file number, and the date of filing the same.

SEC. 91. Except in case of a will devising the land to an executor to his own use or upon some trust or giving to the executor power to sell, no sale or transfer of registered land shall be made by an executor or by an administrator in the course of administration for the payment of debts or for any other purpose, except in pursuance of an order of a court of competent jurisdiction obtained as provided by law.

SEC. 92. But after a memorandum of the will, letters testamentary, or letters of administration have been entered upon the register as hereinbefore provided, the executor or administrator may deal with mortgages, leases, and other personal interests in or upon registered land as if he were the registered owner thereof.

SEC. 93. Where it appears by the will, a certified copy of which with letters testamentary is filed as provided in this Act, that registered land is devised to the executor to his own use, or upon some trust, the executor may have the land transferred to himself upon the register in like manner and subject to like terms and conditions and to like rights as in the case of a transfer pursuant to deed filed in the office of the register of deeds.

SEC. 94. When the will of a deceased owner of registered land, or any estate or interest therein, empowers the executor to sell, convey, encumber, charge, or otherwise deal with the land, it shall not be necessary for such executor to be registered as the owner, but a certified copy of the will and letters testamentary being filed as provided in this Act, such executor may sell, convey, encumber, charge, or otherwise deal with the land pursuant to the power in like manner as if he were the registered owner, subject to the like conditions as to the trust, limitations, and conditions expressed in the will as in case of trusts, limitations, and conditions expressed in a deed.

SEC. 95. Before making distribution of undivided registered lands the executor or administrator shall file in the office of the register of deeds a certified copy of the final decree of the court having jurisdiction of the estate, which shall be conclusive evidence in favor of all persons thereafter dealing with the land that the persons therein named as the only heirs at law of the deceased are such heirs.

SEC. 96. Whenever the court having jurisdiction of the settlement of an estate shall, for the purpose of distribution thereof or for other purposes provided by law, order registered land or any interest or estate therein to be sold by the executor or administrator, upon the filing of a certified copy of the order of sale and the deeds executed in pursuance of the same in the office of the register of deeds, a transfer of the land, estate, or interest to the purchaser may be made upon the register as in the case of other sales by deed, and the original certificate and owner's duplicate shall be canceled and a new certificate and owner's duplicate be issued to the purchaser.

SEC. 97. Whenever, after the final determination of the amount of all claims against the estate of the deceased, it shall be made to appear to the court having jurisdiction of the estate that the estate will justify it and the proof of heirship has been made clear to that court, may direct the executor or administrator to make over and transfer to the devisees or heirs, or some of them, in anticipation of final distribution, a portion or the whole of the registered lands to which they might be entitled on final distribution; and upon the filing of a certified copy of such order in the office of the register of deeds, the executor or administrator may cause such transfer to be made upon the register in like manner as in case of a sale, and a certificate and owner's duplicate certificate shall be issued to the devisees or heirs entitled thereto as in other cases. The land so transferred shall be held free from all liens or claims against the estate. In the proceedings to procure such order or directions such notice shall be given to all parties in interest as the court having jurisdiction of the estate may direct.

SEC. 98. For the purpose of final distribution of the estate the court having jurisdiction thereof may determine the rights of all persons in registered land, or any estate or interest therein, of the deceased, declare and enforce the rights of devisees, heirs, surviving husbands or wives, and others, and make partition and distribution according to the rights of the parties, and may give direction to the executor and administrator as to the transfer of registered lands and any estate or interest therein to the devisees or heirs, and may

direct the transfer to be to the several devisees or heirs or tenants in common, or otherwise, as shall appear to the court to be most convenient, consistently with the rights of the parties, or as the parties interested may agree. A certified copy of the final order, judgment, or decree of the court having jurisdiction of the estate making final distribution shall be filed with the register of deeds and thereupon new certificates and owner's duplicate certificates shall be issued to the parties severally entitled thereto in accordance with such order, judgment, or decree, but nothing in this section contained shall in any way affect or impair existing requirements of law as to notice to be given to all parties interested in the estate of a deceased person before final decree of distribution thereof.

ASSURANCE FUND.

SEC. 90. (*As amended by Act No. 1108.*) Upon the original registration of land under this Act, and also upon the entry of a certificate showing title as registered owners in heirs or devisees, there shall be paid to the register of deeds one-tenth of one per cent of the assessed value of the real estate on the basis of the last assessment for municipal taxation, as an assurance fund.

In case land is subdivided subsequent to the last assessment and registration proceedings are had as to a portion only of such land, the value of such portion, for the purposes of this section, and for the payment required by paragraph four of section one hundred and fourteen, shall be fixed by agreement between the applicant and the tax collector of the city or province where the land is situated and shall be proportioned to the value such land bears to the whole tract assessed. In case of disagreement between the tax collector and the applicant as to the value of the land, the question shall be submitted to the court for decision.

Where land sought to be registered has not been assessed for taxation, its value, for the purposes of this Act, shall be its market value, and the applicant shall file with his application the sworn declaration of three disinterested persons that the value fixed by him is to their knowledge a fair valuation.

The court is authorized to increase the valuation as fixed under the two preceding paragraphs should it appear upon the hearing that the value stated in the application is too small.

SEC. 100. All money received by the register of deeds under the preceding section shall be paid to the Treasurer of the Philippine Archipelago. He shall keep the same invested, with the advice and approval of the Civil Governor, and shall report annually to the legislative body of the Philippine Islands the condition and income thereof.

SEC. 101. Any person who without negligence on his part sustains loss or damage through any omission, mistake, or misfeasance of the clerk, or register of deeds, or of any examiner of titles, or of any deputy or clerk of the register of deeds in the performance of their respective duties under the provisions of this Act, and any person who is wrongfully deprived of any land or any interest therein, without negligence on his part, through the bringing of the same under the provisions of this Act or by the registration of any other person as owner of such land, or by any mistake, omission, or misdescription in any certificate or owner's duplicate, or in any entry or memorandum in the register or other official book, or by any cancellation, and who by the provisions of this Act is barred or in any way precluded from bringing an action for the recovery of such land or interest therein, or claim upon the same, may bring in any court of competent jurisdiction an action against the Treasurer of the Philippine Archipelago for the recovery of damages to be paid out of the assurance fund.

SEC. 102. If such action be for recovery for loss or damage arising only through any omission, mistake, or misfeasance of the clerk, or of the register of deeds, or of any examiner of titles, or of any deputy or clerk of the register of deeds in the performance of their respective duties under the provisions of this Act, then the Treasurer of the Philippine Archipelago shall be the sole defendant to such action. But if such action be brought for loss or damage arising only through the fraud or willful act of some person or persons other than the clerk, the register of deeds, the examiners of titles, deputies, and clerks, or arising jointly through the fraud or wrongful act of such other person or persons and the omission, mistake, or misfeasance of the clerk, the register of deeds, the examiners of titles, deputies, or clerks, then such action shall be brought against both the Treasurer of the Philippine Archipelago and

such person or persons aforesaid. In all such actions where there are defendants other than the Treasurer of the Philippine Archipelago and damages shall have been recovered, no final judgment shall be entered against the Treasurer of the Philippine Archipelago until execution against the other defendants shall be returned unsatisfied in whole or in part, and the officer returning the execution shall certify that the amount still due upon the execution can not be collected except by application to the assurance fund. Thereupon the court having jurisdiction of the action, being satisfied as to the truth of such return, may, upon proper showing, order the amount of the execution and costs, or so much thereof as remains unpaid, to be paid by the Treasurer of the Philippine Archipelago out of the assurance fund. It shall be the duty of the Attorney-General in person or by deputy to appear and defend all such suits with the aid of the fiscal of the province in which the land lies or the city attorney of the city of Manila as the case may be: *Provided, however*, That nothing in this Act shall be construed to deprive the plaintiff of any action which he may have against any person for such loss or damage or deprivation of land or of any estate or interest therein without joining the Treasurer of the Philippine Archipelago as a defendant therein.

SEC. 103. If the assurance fund at any time be not sufficient to meet the amount called for by such judgment, the Treasurer of the Philippine Archipelago shall make up the deficiency from any funds in the Treasury not otherwise appropriated; and in such case any sums thereafter received by the Treasurer on account of the assurance fund shall be transferred to the general fund of the Treasury, until the amount paid on account of the deficiency shall have been made up.

SEC. 104. In every case where payment has been made by the Treasurer of the Philippine Archipelago in accordance with the provisions of this Act, the Government of the Philippine Islands shall be subrogated to all rights of the plaintiff against any other parties or securities, and the Treasurer shall enforce the same in behalf of the Government. Any sum so recovered by the Treasurer shall be paid into the Treasury of the Philippine Islands to the account of the assurance fund.

SEC. 105. The income of the assurance fund shall be added to the principal and invested, until said fund amounts to the sum of two hundred thousand dollars, and thereafter the income of such fund shall be paid into the Insular Treasury for the general purposes of the Insular Government.

The term "dollars" wherever used in this Act shall be construed to mean money of the United States.

SEC. 106. The assurance fund shall not be liable to pay for any loss or damage or deprivation occasioned by a breach of trust, whether express, implied, or constructive, by any registered owner who is a trustee, or by the improper exercise of any sale in mortgage foreclosure proceedings. Nor shall any plaintiff recover as compensation in an action under this Act more than the fair market value of the real estate at the time when he suffered the loss, damage, or deprivation thereof.

SEC. 107. All actions for compensation under this Act by reason of any loss or damage or deprivation of land or any estate or interest therein shall be begun within the period of six years from the time when the right to bring or take such action or proceeding first accrued, and not afterwards: *Provided*, That the right of action herein provided shall survive to the personal representative of the person sustaining loss or damage, if deceased, unless barred in his lifetime: *And provided further*, That if at the time when such right of action first accrues the person entitled to bring such action or take such proceeding is within the age of majority, or insane, or imprisoned, such person, or anyone claiming from, by, or under him, may bring the action or take the proceeding at any time within two years after such disability is removed, notwithstanding the time before limited in that behalf has expired.

POWERS OF ATTORNEY.

SEC. 108. Any person may by power of attorney procure land to be registered and conveyed or otherwise deal with registered land, but the letters of attorney shall be acknowledged before a notary public or a judge or clerk of a court of record attested by at least one witness and shall be filed with the clerk or register of deeds of the province where the land lies, and registered. Any instrument revoking such letters shall be acknowledged, attested, and registered in like manner.

LOST DUPLICATE CERTIFICATE.

SEC. 109. If a duplicate certificate is lost or destroyed, or can not be produced by a grantee, heir, devisee, assignee, or other person applying for the entry of a new certificate to him or for the registration of any instrument, a suggestion of the fact of such loss or destruction may be filed by the registered owner or other person in interest, and registered. The court may thereupon, upon the petition of the registered owner or other person in interest, after notice and hearing, direct the issue of a new duplicate certificate, which shall contain a memorandum of the fact that it is issued in place of the lost duplicate certificate, but shall in all respects be entitled to like faith and credit as the original duplicate and shall thereafter be regarded as the original duplicate for all purposes of this Act.

ADVERSE CLAIMS.

SEC. 110. Whoever claims any right or interest in registered land adverse to the registered owner, arising subsequent to the date of the original registration, may, if no other provision is made in this Act for registering the same, make a statement in writing setting forth fully his alleged right or interest, and how or under whom acquired, and a reference to the volume and page of the certificate of title of the registered owner, and a description of the land in which the right or interest is claimed. The statement shall be signed and sworn to, and shall state the adverse claimant's residence, and designate a place at which all notices may be served upon him. This statement shall be entitled to registration as an adverse claim, and the court, upon a petition of any party in interest, shall grant a speedy hearing upon the question of the validity of such adverse claim and shall enter such decree therein as justice and equity may require. If the claim is adjudged to be invalid, the registration shall be canceled. If in any case the court after notice and hearing shall find that a claim thus registered was frivolous or vexatious, it may tax the adverse claimant double or treble costs in its discretion.

SURRENDER OF DUPLICATE CERTIFICATES.

SEC. 111. In every case where the clerk or any register of deeds is requested to enter a new certificate in pursuance of an instrument purporting to be executed by the registered owner, or by reason of any instrument or proceedings which divest the title of the registered owner against his consent, if the outstanding owner's duplicate certificate is not presented for cancellation when such request is made, the clerk or register of deeds shall not enter a new certificate, but the person claiming to be entitled thereto may apply by petition to the court. The court, after hearing, may order the registered owner or any person withholding the duplicate to surrender the same, and direct the entry of a new certificate upon such surrender.

If in any case the person withholding the duplicate certificate is not amenable to the process of the court, or if for any reason the outstanding owner's duplicate certificate can not be delivered up, the court may by decree annul the same, and order a new certificate of title to be entered. Such new certificate and all duplicates thereof shall contain a memorandum of the annulment of the outstanding duplicate.

If in any case an outstanding mortgagee's or lessee's duplicate certificate is not produced and surrendered when the mortgage is discharged or extinguished or the lease is terminated, like proceedings may be had to obtain registration as in the case of the nonproduction of an owner's duplicate.

AMENDMENT AND ALTERATION OF CERTIFICATES OF TITLE.

SEC. 112. No erasure, alteration, or amendment shall be made upon the registration book after the entry of a certificate of title or of a memorandum thereon and the attestation of the same by the clerk or any register of deeds, except by order of the court. Any registered owner or other person in interest may at any time apply by petition to the court, upon the ground that registered interests of any description, whether vested, contingent, expectant, or inchoate, have terminated and ceased; or that new interests have arisen or been created which do not appear upon the certificate; or that any error, omission, or mistake was made in entering a certificate or any memorandum thereon, or on any

duplicate certificate; or that the name of any person on the certificate has been changed; or that the registered owner has been married; or if registered as married, that the marriage has been terminated; or that a corporation which owned registered land and has been dissolved has not conveyed the same within three years after its dissolution; or upon any other reasonable ground; and the court shall have jurisdiction to hear and determine the petition after notice to all parties in interest, and may order the entry of a new certificate, the entry or cancellation of a memorandum upon a certificate, or grant any other relief upon such terms and conditions, requiring security if necessary, as it may deem proper: *Provided, however,* That this section shall not be construed to give the court authority to open the original decree of registration, and that nothing shall be done or ordered by the court which shall impair the title or other interest of a purchaser holding a certificate for value and in good faith, or his heirs or assigns, without his or their written consent.

Any petition filed under this section and all petitions and motions filed under the provisions of this Act after original registration shall be filed and entitled in the original case in which the decree of registration was entered.

SERVICE OF NOTICES AFTER REGISTRATION.

SEC. 113. All notices required by or given in pursuance of the provisions of this Act by the clerk or any register of deeds, after original registration, shall be sent by mail to the person to be notified at his residence and post-office address as stated in the certificate of title, or in any registered instrument under which he claims an interest, in the office of the clerk or register of deeds, relating to the parcel of land in question.

All notices and citations directed by special order of the court under the provisions, of this Act, after original registration, may be served in the manner above stated, and the certificate of the clerk shall be conclusive proof of such service: *Provided, however,* That the court may in any case order different or further service, by publication or otherwise, and shall in all cases do so when the interests of justice require such action.

FEES FOR REGISTRATION.

SEC. 114. (*As amended by Acts Nos. 1108 and 1648.*) Fees payable under this Act shall be as follows:

From the time of filing the application until the final determination of each case, for all services performed by the clerk or his deputies in each case, except the taking of affidavits or acknowledgments, including filing, entering, indexing, and recording all documents, plans, orders, decrees, and other papers, all notices by mail or publication, and a certified copy of the decree of registration, if any there be, there shall be paid by the applicant to the clerk the sum in the following table corresponding to the value of the property, which shall be the assessed value if the property is assessed, otherwise the market value, determined as provided in section ninety-nine of this Act:

Property not exceeding one hundred dollars in value, five dollars.

Property not exceeding five hundred dollars but over one hundred dollars in value, fifteen dollars.

Property not exceeding one thousand dollars but over five hundred dollars in value, twenty dollars.

Property not exceeding five thousand dollars but over one thousand dollars in value, twenty-five dollars.

Property not exceeding twenty-five thousand dollars but over five thousand dollars in value, forty dollars.

Property not exceeding fifty thousand dollars but over twenty-five thousand dollars in value, fifty dollars.

Property exceeding fifty thousand dollars in value, one hundred dollars.

For all services by a sheriff or other officer under this Act, the same fees as are now provided by law for like services.

For entry of original certificate of title, and issuing one duplicate certificate, three dollars.

For making and entering a new certificate of title, including issue of one duplicate certificate, one dollar.

For each duplicate certificate, after the first, fifty cents.

For the registration of every instrument, whether single or in duplicate or triplicate, including entering, indexing, and filing the same, and attesting registra-

tration thereof, and also making and attesting copy of memorandum on one instrument or on a duplicate certificate when required, one dollar and fifty cents.

For making and attesting copy of memorandum on each additional instrument or duplicate certificate if required, fifty cents.

For filing and registering an adverse claim, three dollars.

For entering statement of change of residence or post-office address, including indorsing and attesting the same on a duplicate certificate, twenty-five cents.

For entering any note in the entry book or in the registration book, twenty-five cents.

For the registration of a suggestion of death or notice of bankruptcy, insolvency, or analogous proceeding, twenty-five cents.

For the registration of a discharge or release of mortgage or other instrument creating an incumbrance, fifty cents.

For the registration of any levy, or of any discharge or dissolution of any attachment or levy, or of any certificate of or receipt for the payment of taxes, or notice of any pending action, or of a judgment or decree, fifty cents.

For indorsing on any mortgage, lease, or other instrument a memorandum of partition, one dollar.

For every petition filed under this Act after original registration, one dollar.

For a certified copy of any decree or registered instrument, the same fees as are provided by the Code of Procedure in Civil Actions and Special Proceedings for clerks of Courts of First Instance for like services.

In all cases not expressly provided for by the law the fees of all public officers for any official duty or service under this Act shall be at the same rate as those prescribed herein for like services.

PENALTIES.

SEC. 115. Certificates of title and duplicate certificates issued under this Act shall be subjects of larceny.

SEC. 116. Whoever knowingly swears falsely to any statement required to be made under oath by this Act shall be guilty of perjury and liable to the penalties provided by law for perjury.

SEC. 117. Whoever fraudulently procures, or assists in fraudulently procuring or is privy to the fraudulent procurement of any certificate of title or owner's duplicate certificate, or of any entry in the register or other book kept in the office of the clerk or of any register of deeds, or of any erasure or alteration in any entry in any set of books or in any instrument authorized by this Act, or knowingly defrauds or is privy to defrauding any person by means of a false or fraudulent instrument, certificate, owner's duplicate certificate, statement or affidavit affecting registered land, shall be fined not exceeding five thousand dollars or imprisoned not exceeding five years, or both, in the discretion of the court.

SEC. 118. (1) Whoever forges or procures to be forged or assists in forging the seal of the clerk or of any register of deeds, or the name, signature, or handwriting of any officer of the court or of the register of deeds, in case where such officer is expressly or impliedly authorized to affix his signature; or

(2) Fraudulently stamps or procures to be stamped or assists in stamping any document with any forged seal of the clerk or register of deeds; or

(3) Forges, or procures to be forged, or assists in forging the name, signature, or handwriting of any person whosever to any instrument which is expressly or impliedly authorized to be signed by such person under the provisions of this Act; or

(4) Uses any document upon which an impression, or part of the impression, of any seal of the clerk or of a register of deeds has been forged, knowing the same to have been forged, or any document the signature to which has been forged, knowing the same to have been forged, shall be imprisoned not exceeding ten years or fined not exceeding five thousand dollars, or both, in the discretion of the court.

Prosecutions for offenses for violations of any of the provisions of this Act shall be instituted and conducted in the proper Court of First Instance.

SEC. 119. Whoever, with intent to defraud, sells and conveys registered land knowing that an undischarged attachment or any other incumbrance exists thereon which is not noted by memorandum on the duplicate certificate of the title, without informing the grantee of such attachment or other incumbrance before the consideration is paid, shall be punished by imprisonment not exceed-

ing three years or by a fine not exceeding one thousand dollars, or by both, in the discretion of the court.

SEC. 120. No conviction for any act prohibited by this Act shall affect any remedy which any person aggrieved or injured by such act may be entitled to by law against the person who has committed such act or against his estate.

REGISTER OF DEEDS IN MANILA.

SEC. 121. Wherever in this Act the phrase "the register of deeds in the province where the land lies," or an equivalent phrase, occurs, it shall be construed to include and be applicable to the register of deeds in the city of Manila.

PUBLIC LANDS.

SEC. 122. Whenever public lands in the Philippine Islands belonging to the Government of the United States or to the Government of the Philippine Islands are alienated, granted, or conveyed to persons or to public or private corporations, the same shall be brought forthwith under the operation of this Act and shall become registered lands. It shall be the duty of the official issuing the instrument of alienation, grant, or conveyance in behalf of the Government to cause such instrument, before its delivery to the grantee, to be filed with the register of deeds for the province where the land lies and to be there registered like other deeds and conveyances, whereupon a certificate shall be entered as in other cases of registered land, and an owner's duplicate certificate issued to the grantee. The deed, grant, or instrument of conveyance from the Government to the grantee shall not take effect as a conveyance or bind the land, but shall operate only as a contract between the Government and the grantee and as evidence of authority to the clerk or register of deeds to make registration. The act of registration shall be the operative act to convey and affect the lands, and in all cases under this Act registration shall be made in the office of the register of deeds for the province where the land lies. The fees for registration shall be paid by the grantee. After due registration and issue of the certificate and owner's duplicate, such land shall be registered land for all purposes under this Act.

ACT, HOW CONSTRUED.

SEC. 123. This Act shall be construed liberally so far as may be necessary for the purpose of effecting its general intent.

CONTINUANCE OF EXISTING SYSTEM AS TO UNREGISTERED LAND.

SEC. 124. (*As amended by Act No. 700.*) As to lands not registered in accordance with the provisions of this Act, the system of registration and recording heretofore established by law in these islands shall continue and remain in force, except in so far as hereinafter modified, and the evidential weight given by existing law to titles registered as existing law now provides shall be accorded to such titles in the hearings had under this Act before the examiners and before the court. The duties of registering and recording land titles in accordance with the law heretofore existing shall be performed in the several provinces and the city of Manila by the registers of deeds in this Act provided, after such registers of deeds have been appointed: *Provided, however*, That the originals of deeds, mortgages, leases, and other instruments affecting the title to unregistered land shall not be retained by notaries public or other officials before whom the same are solemnized, but after having been duly executed may be delivered to the grantee, mortgagee, lessee, or other person entitled to the same and be by him presented to the register of deeds for the province where the land lies for registration and recording, in the same manner and with the same legal effect that copies thereof certified by notaries public under existing law are registered and recorded. The register of deeds upon receiving any such deed, mortgage, lease, or other instrument dealing with land not registered under this Act shall indorse upon the instrument so received the true year, month, day, hour, and minute when the same is received, and the same shall be deemed to have been registered and recorded as unregistered land from the time of the indorsement of such memorandum thereon. He shall also indorse thereon the volume and page wherein the same is registered and recorded. After the due registration and recording of such instrument the

owner thereof shall be entitled to the custody and possession of the same. The original instrument, the record thereof in the books of the register of deeds, and any certified copy of such record shall be competent evidence in any court of justice. The fees of the register of deeds for registering and recording any such instrument shall be the same as those now provided by law for registering and recording a certified copy of a notarial instrument dealing with land.

All the powers and faculties conferred by sections two hundred and sixty-eight (paragraph five), two hundred and sixty-nine and two hundred and seventy-six of the Mortgage Law, and sections one hundred and twelve and one hundred and twenty of the regulations for its execution, upon the president of the audiencia and the judges of First Instance in the matter of inspecting registries of property, receiving consultations from the registers of deeds and hearing and determining all questions affecting the registration of instruments, are hereby conferred upon the Court of Land Registration created by this Act.

SEC. 125. Until registers of deeds shall be appointed in accordance with the provisions of this Act, the officials performing the duties of registrars and recorders of deeds in the several provinces and in the city of Manila shall be registers of deeds and perform the duties of registers of deeds as defined by this Act. Their deputies shall be deputy registers of deeds. All laws relative to existing registrars of deeds and recorders, their deputies, including their compensation, clerk hire, and expenses, shall extend to registers of deeds and their deputies under this Act so far as the same may be applicable.

NOTARIES PUBLIC.

SEC. 126. All notaries public in the Islands, and all other officials and persons having in their possession notarial books, records, protocols, archives, and other documents, shall immediately deliver to the Chief of the Bureau of Archives all such notarial books, records, protocols, archives, and documents in accordance with the provision of section eighty of Act Numbered One hundred and thirty-six, entitled "An Act providing for the organization of courts in the Philippine Islands," and hereafter notaries public shall only have the powers and perform the duties prescribed for notaries public in sections eighty-one to ninety-one, inclusive, of said Act Numbered One hundred and thirty-six.

FORMS.

SEC. 127. (*As amended by Act No. 700.*) Deeds, conveyances, mortgages, leases, releases, and discharges affecting lands, whether registered under this Act or unregistered, shall be sufficient in law when made substantially in accordance with the following forms, and shall be as effective to convey, encumber, lease, release, discharge, or bind the lands as though made in accordance with the more prolix forms heretofore in use: *Provided*, That every such instrument shall be signed by the person or persons executing the same, in the presence of two witnesses, who shall sign the instrument as witnesses to the execution thereof, and shall be acknowledged to be his or their free act and deed by the person or persons executing the same, before the judge of a court of record or clerk of a court of record, or a notary public, or a justice of the peace, who shall certify to such acknowledgment substantially in the form next hereinafter stated.

1. *Form of acknowledgment by person executing deed of conveyance, mortgage, lease, release, or discharge affecting land.*

UNITED STATES OF AMERICA, PHILIPPINE ISLANDS.

Province (or city) of _____ (date).

At the municipality of _____, in said province, on this _____ day of _____, A. D. 19____, personally appeared _____, married _____, known to me to be the same person (or persons) who executed the foregoing instrument and acknowledged that the same is his (or their) free act and deed. The cedula certificates of the parties to the instrument were exhibited to me, being Nos. _____, issued at _____, dated _____, 19____.

Before me,

(Notary public or other official authorized to administer oaths.)

2. Deed of land registered under this Act.

I, _____, married _____, of _____, in the Province of _____, in the Philippine Islands, in consideration of _____ dollars, to me paid by _____, of _____, in the Province of _____, in the Philippine Islands, do hereby sell and convey to said _____ and his heirs and assigns that parcel of land, together with all the buildings and improvements thereon, situated in the municipality of _____, and Province of _____, in the Philippine Islands, bounded and described as follows (here insert boundaries and description), of which land I am the registered owner in accordance with the provisions of The Land Registration Act, my title thereto being evidenced by Certificate Number _____ in the land records of said province.

In witness whereof, I have hereunto signed my name on this _____ day of _____, A. D. 19____.

Signed in the presence of: _____

(To be followed by acknowledgment according to Form 1.)

3. Deed of land not registered under this Act, without covenants of warranty.

I, _____, married _____, of _____, in the Province of _____, in the Philippine Islands, in consideration of _____ dollars, to me paid by _____, of _____, in the Province of _____, in the Philippine Islands, do hereby sell and convey to the said _____ his heirs and assigns, that parcel of land, together with all the buildings and improvements thereon, situated in the municipality of _____, in the Province of _____, in the Philippine Islands, bounded and described as follows (here insert boundaries and description).

In witness whereof, I have hereunto signed my name, on this _____ day of _____, A. D. 19____.

Signed in the presence of: _____

(Acknowledgment.)

4. Deed of land not registered under this Act, with covenants of warranty.

I, _____, married _____, of _____, in the Province of _____, in the Philippine Islands, in consideration of _____ dollars, to me paid by _____, of _____, in the Province of _____, in the Philippine Islands, do hereby sell and convey to the said _____ his heirs and assigns, that parcel of land, together with all the buildings and improvements thereon, situated in the municipality of _____, in the Province of _____, in the Philippine Islands, bounded and described as follows (here insert boundaries and description); and the said _____ (seller) does hereby covenant and agree with the said _____ (purchaser) that he is lawfully seized in fee of said premises, that they are free from all incumbrances, that he has a perfect right to convey the same, and that he will warrant and forever defend the same unto the said _____ (purchaser), his heirs and assigns, against the lawful claims of all persons whomsoever (or insert other covenants, whatever they may be).

In witness whereof, etc.

Signed in presence of: _____

(Acknowledgment.)

5. Mortgage of land registered under this Act.

I, _____, married _____, of _____, in the Province of _____, in the Philippine Islands, in consideration of _____ dollars, to me paid by _____, of _____, in the Province of _____, in the Philippine Islands, do hereby, by way of mortgage, convey to the said _____, his heirs and assigns, that parcel of land, together with all the buildings and improvements thereon, situated in the municipality of _____, in the Province of _____, in the Philippine Islands, bounded and described as follows (here insert boundaries and description), of which land I am the registered owner, in accordance with the provisions of The Land Registration Act, my title thereto being evidenced by Certificate Number _____, in the land records of said province; provided, nevertheless, that if I, the said _____ (mortgagor) shall duly pay, or cause to be paid, to the said _____ (mortgagee) my certain promissory notes of this date by me signed, and payable to the said _____ (mortgagee), all dated on this date, each for the sum of _____ dollars, and payable in one, two, and three years from date (or otherwise, as the case may be), with lawful interest, then this mortgage shall be thereby discharged and of no further effect, otherwise it shall remain in full force and be enforceable in the manner provided by law.

In witness whereof, etc.

Signed in the presence of: _____

(Acknowledgment.)

6. Mortgage of land not registered under this Act.

This mortgage may be in the same form as that prescribed in Form No. 5, but omitting that portion of Form No. 5 which describes the land as registered under the Land Registration Act, and including such covenants of warranty as the parties may agree upon.

7. Discharge of mortgage of land registered under this Act.

I, _____, married _____, of _____, in the Province of _____, in the Philippine Islands, mortgagee of the land embraced in Certificate Number _____ in the land records of the Province of _____, by virtue of a mortgage executed by _____, of _____, in the Province of _____, in the Philippine Islands, on the _____ day of _____, 19____, having received the full consideration named as the condition of said mortgage, do hereby forever release and discharge the same.

In witness whereof, etc.

Signed in the presence of: _____

(Acknowledgment.)

8. Discharge of mortgage of land not registered under this Act.

The discharge in this case may be as in Form No. 7, varying the description of the mortgage to suit the facts.

9. Lease of land registered under this Act.

I, _____, married _____, of _____, in the Province of _____, in the Philippine Islands, in consideration of the agreements hereinafter contained, do hereby lease unto _____, of _____, in the Province of _____, in the Philippine Islands, and his assigns (if the lease is to be assignable), that parcel of land, together with all the buildings and improvements thereon, situated in the municipality of _____, in the Province of _____, in the Philippine Islands, bounded and described as follows (here insert boundaries and description), of which land I am the registered owner, in accordance with the provisions of The Land Registration Act, my title thereto being evi-

denced by Certificate Number ----- in the land records of said province, for the period of ----- years from this date.

And I, the said lessee, in consideration of this lease, do hereby promise, for myself and my heirs and assigns, that I will cause to be paid to the said ----- (lessor), an annual rental (or monthly rental) of ----- dollars per year (or per month, as the case may be) during the whole period of this lease, payable on the ----- day of ----- of each year (or at such other times as may be agreed upon).

(Other special agreements of the lease may be here inserted.)

In witness whereof, etc.

Signed in the presence of: -----

(Acknowledgment.)

10. Lease of land not registered under this Act.

This lease may be as in Form No. 9, omitting that portion thereof that relates to the certificate of title, and inserting such covenants of warranty as may be agreed upon.

11. Release of leased lands, whether registered under this Act or not.

Such release may be as in Forms Nos. 7 and 8, for the discharge of mortgages, using the term "release," instead of "discharge," and inserting such description as fully identifies the lease.

SEC. 128. (*As amended by Act No. 700.*) The Court of Land Registration, for the purpose of giving publicity to the law and to facilitate the work of the court, is authorized to have printed for free distribution such number of blank forms of application, rules and regulations, forms of deeds, mortgages and leases, or other matter of use or information to the public in the registration of lands as the Court may in its discretion deem proper.

SEC. 129. (*As amended by Acts Nos. 572 and 700.*) This Act shall take effect February first, nineteen hundred and three, and the law in force prior to January first, nineteen hundred and three, in reference to the registration of titles to lands in the Philippine Islands, the execution of conveyances and the duties of notaries public and their appointment, is hereby continued in force for the month of January, nineteen hundred and three, including the first day thereof.

Enacted, November 6, 1902.

THE FOREST MANUAL

Containing

The Forest Act (No. 1148), extracts from other laws of the Philippine Commission relating to the forest service, and the Forest Regulations prepared in accordance with the provisions of the Forest Act.

LETTER OF TRANSMITTAL.

DEPARTMENT OF INTERIOR, BUREAU OF FORESTRY,
OFFICE OF THE CHIEF OF BUREAU,
Manila, June 30, 1904.

SIR: I have the honor to transmit herewith the manuscript of "The Forest Manual," containing the Forest Act, extracts from other laws relating to the forest service, the forest regulations, and notes, and recommend its publication. Very respectfully,

GEORGE P. AHERN,
Captain, Ninth United States Infantry,
Chief of Bureau of Forestry.

The SECRETARY OF THE INTERIOR,
Manila, P. I.

The Forest Act—No. 1148 (as amended by Act No. 1575).

AN ACT To regulate the use of the public forests and forest reserves in the Philippine Islands and repealing General Orders, Numbered Ninety-two, series of nineteen hundred, Act Numbered Two hundred and seventy-four, and sections twenty of Act Numbered Forty-nine, eleven of Act Numbered One hundred and nineteen, and eleven of Act Numbered One hundred and twenty.

By authority of the United States, be it enacted by the Philippine Commission, that:

SECTION 1. The short title of this Act shall be "The Forest Act."

SEC. 2. The public forests and forest reserves of the Philippine Islands shall be held and administered for the protection of the public interest, the utility and safety of the forests, and the perpetuation thereof in productive condition by wise use; and it is the purpose of this Act to provide for the same.

SEC. 3. The public forests shall include all unreserved public lands covered with trees of whatever age.

SEC. 4. Upon the recommendation of the Chief of the Bureau of Forestry, with the approval of the Secretary of the Interior, the Civil Governor may set apart forest reserves from the public lands, and he shall by proclamation declare the establishment of such reserves and the boundaries thereof, and thereafter such forest reserves shall not be entered, sold, or otherwise disposed of, but shall remain as such for forest uses, and shall be administered, except as provided in this section, in like manner as the public forests under this Act: *Provided*, That the Civil Governor may in like manner by proclamation alter or modify the boundaries of any forest reserve from time to time, or revoke any such proclamation, and upon such revocation such forest reserve shall be and become part of the public lands as though such proclamation had never been made.

SEC. 5. The public forests and forest reserves and the timber, firewood, gums, and other products thereof shall not be sold, entered, leased, or otherwise disposed of except as herein provided: *Provided*, That any mining claim as de-

fined in section one of Act Numbered Six hundred and twenty-four, entitled "An Act prescribing regulations governing the location and manner of recording mining claims, and the amount of work necessary to hold possession of a mining claim, under the provisions of the Act of Congress approved July first, nineteen hundred and two, entitled 'An Act temporarily to provide for the administration of the affairs of civil government in the Philippine Islands, and for other purposes,' " in any of the public forests and forest reserves shall be entered only as provided in said Act Numbered Six hundred and twenty-four, and the provisions of this Act shall not be applicable to the entry and location of such claims, but they shall be governed by Act Numbered Six hundred and twenty-four exclusively: *And provided further*, That the authority given by the Chief of the Bureau of Forestry, as hereinafter provided, to issue licenses for the taking of stone and earth from public forests and forest reserves shall be understood to apply only when such stone and earth is taken from lands not more valuable for mining purposes than for other purposes, and therefore not subject to entry as a mining claim.

Sec. 6. No prescriptive right to the use, possession, or enjoyment of any forest product, nor any permanent concession, continuing right, privilege, or easement, of any kind whatsoever, upon or within or respecting the products of the public forests or forest reserves, shall accrue or be granted except as provided in this Act. But the public forests and forest reserves shall be and remain open of access for all lawful purposes to the people of the Philippine Islands except as provided in this Act.

Sec. 7. Lands in public forests, upon the certification of the Chief of the Bureau of Forestry that said lands are better adapted and more valuable for agricultural than for forest purposes and not required by the public interests to be kept under forest, shall be declared by the Secretary of the Interior to be agricultural lands.

When in his opinion the public interests so require, the Chief of the Bureau of Forestry may make application to the Chiefs of the Bureaus of Agriculture and Public Lands for the detail of an official from each of said Bureaus to form, with an official from the Bureau of Forestry, a committee for the purpose of assisting said Chief of the Bureau of Forestry in making this certification, and upon the receipt of such application it shall be the duty of each of said Chiefs of the Bureaus of Agriculture and Public Lands to direct one of his subordinates to render the assistance applied for.

Sec. 8. The Chief of the Bureau of Forestry, with the approval of the Secretary of the Interior, shall prescribe such regulations not inconsistent with the provisions of this Act as may be expedient or necessary for the protection, management, reproduction, occupancy, and use of the public forests and forest reserves, and the said Chief, with the approval of the Secretary of the Interior, is hereby authorized to alter and revise such regulations. He shall in particular provide for the use of the public forests and forest reserves in such manner as to insure for the future a continued supply of valuable timber and other forest products.

Sec. 9. The Chief of the Bureau of Forestry, with the approval of the Secretary of the Interior, may, upon proper terms which he may deem reasonable, lease, as herein provided, tracts of land not exceeding four hectares in extent in the public forests and forest reserves, to any person or to any association of persons holding timber licenses, for occupancy as sites for sawmills or timber depots, and the Secretary of the Interior may grant free rights of way through the public lands to enable such persons or association of persons to get access to the land to which such licenses apply.

Sec. 10. The Chief of the Bureau of Forestry, with the approval of the Secretary of the Interior, may select for sale or disposal, and may sell or dispose of by license, from the public forests and forest reserves, at rates of charge to be established by him in accordance with the provisions of sections eleven and twelve of this Act, any timber, firewood for commercial use, gums, resins, and other forest products, whose removal will not be detrimental to the public forests or forest reserves or to the interests which depend upon them.

Sec. 11. (*As amended by Act No. 1575.*) For the purposes of this Act the various native trees are divided into four groups:

The first group shall include acle, betis, baticulin, camagon, ebony, ipil, laneta, mancono, molave, narra, tindalo, and yacal.

The second group shall include alupag, aranga, banaba, bansalaguin, banuyo, batitnan, bolongeta, calamansanay, canlantas, dungon, guiho, macasin, malacados, mangachapuy, palo Maria, supa, teak, and tucan-calao.

The third group shall include agoho, amuguis, anubing, apitong, batino, bitanhol, catmon, calumpit, cupang, dalinsi, dita, dungonlate, malacmalac, malapapaya, malasantol, mayapis, nato, palosapis, panao, sacat, santol, tamayuan, and tanguile.

The fourth group shall include anaho, anam, apuit, bacao, balacat, balinhasay, batete, bayoc, bonga, bulao, lauan, malaanonang, malabalac, malabonga, mangasinoro, manilic, pagatpat, and pagsainguin.

Sec. 12. (*As amended by Act No. 1575.*) The metric system of weights and measures, as adopted by sections thirty-five hundred and sixty-nine and thirty-five hundred and seventy of the Revised Statutes of the United States, shall be used.

On each cubic meter of timber which may be cut in any public forest or forest reserve in any of the provinces of the Philippine Islands for domestic sale or consumption, or for export, there shall be paid, within thirty days from date of the receipt by the owner or his agent of the order of payment of the Government charge on the same, into the Insular Treasury, as provided by existing law, the following sums:

On all timber included in the first group, two pesos and fifty centavos.

On all timber included in the second group, one peso and fifty centavos.

On all timber included in the third group, one peso.

On all timber included in the fourth group and on all nonenumerated timber, fifty centavos: *Provided*, That the taxes imposed in this section on ebony and camagon shall be charged on said timbers when presented for measurement and appraisal with the sapwood still attached; and the number of cubic meters in each piece of timber so measured shall include the sapwood attached to the same, and when ebony or camagon timber from which the sapwood has been stripped is presented for measurement and appraisal there shall be assessed and collected the following sums:—

On each cubic meter of ebony, six pesos. On each cubic meter of camagon, four pesos and fifty centavos.

The volume of all round timber shall be ascertained by multiplying the area of the small end by the length of the log. The volume of all squared timber shall be ascertained by multiplying the average cross section by the length, to which twenty-five per centum shall be added for loss in squaring. The volume of all sawn timber shall be ascertained by multiplying the average cross section by the length, to which fifteen per centum shall be added for loss in sawing.

All timber included in the preceding section in the third and fourth groups and all nonenumerated timber cut in any province, known in the market under the name of "raja" and which shall not exceed one and one-half meters in length and fifteen centimeters in diameter, shall be classed as firewood, and the following taxes shall be collected thereon:

On all firewood consisting of "rajas" from sixty centimeters to one and one-half meters in length, and from seven centimeters to fifteen centimeters in diameter, one peso for each one thousand rajas.

On all firewood consisting of pieces of timber less than sixty centimeters in length and less than seven centimeters in diameter, ten centavos per cubic meter: *Provided*, That whenever in the opinion of the Chief of the Bureau of Forestry the preservation and use of the public forests and forest preserves shall render necessary the removal of the tops of fallen timber, said tops when removed in accordance with the regulations prescribed by the Chief of the Bureau of Forestry, shall be exempted from the payment of any tax imposed in this section on timber or firewood or other forest products.

On all gums and resins and other forest products gathered or removed from any province there shall be paid on the actual market value thereof ten per centum. The Collector of Internal Revenue and the Chief of the Bureau of Forestry shall upon the passage of this Act, and from time to time thereafter, make a joint assessment of the actual market value of the various products on which taxes are imposed in this section; said assessments shall be made from the most reliable data available and shall be published in the Official Gazette for the information of taxpayers.

Sec. 13. The Chief of the Bureau of Forestry, with the approval of the Secretary of the Interior, may, as herein provided, issue licenses for the cutting, collection, and removal of timber, firewood, gums, resins, and other forest products from the public forests and forest reserves. Every license so issued shall specify in detail the rights to which it entitles the holder and shall provide, whenever practicable, for exclusive territory in similar products to each licensee. All licenses for timber shall provide for the selection of said timber

before cutting: *Provided*, That when absolutely necessary the selection of timber or the granting of exclusive territory may, in the discretion of the Chief of the Bureau of Forestry, be omitted in any license terminating not later than June thirtieth, nineteen hundred and eight, after which date the selection of timber and the granting of exclusive territory whenever practicable shall be required.

SEC. 14. No license granted under the provisions of this Act shall continue in force for more than twenty years. The Chief of the Bureau of Forestry, with the approval of the Secretary of the Interior, may, in granting any exclusive license, prescribe such terms, conditions, and limitations not inconsistent with the provisions of this Act, including a minimum amount of timber to be cut within a specified period or periods of time, as may be deemed by the Chief of the Bureau of Forestry and Secretary of the Interior to be in the public interest, and may provide in such licenses for forfeiture thereof in case of violation of such terms, conditions, or limitations.

SEC. 15. The Chief of the Bureau of Forestry, with the approval of the Secretary of the Interior, shall publicly announce what classes of licenses shall be issued.

SEC. 16. The Chief of the Bureau of Forestry may, for violations of the Forest Act or of the regulations, to be determined and declared by him, with the approval of the Secretary of the Interior, revoke or temporarily suspend any license.

SEC. 17. A gratuitous license to cut and use timber for mining purposes shall be granted on application to the holder, locator, owner, lessee, or operator of a mining claim. Said license shall be limited to the claim on which the timber is cut, and no timber shall be used under such license except in the development of the claim upon which it is cut. Said license shall specify the kinds and uses of the timber to which it entitles the holder, and the territorial limits within which it is valid. A miner's timber license to cut timber in the public forests or forest reserves other than that standing on the claim and desired for the development of said claim may be obtained on application by the holder, locator, owner, lessee, or operator of a mining claim. Said license shall specify the kinds and uses of the timber to which it entitles the holder and the territorial limits within which it is valid. The Government charge on timber thus used under a miner's timber license shall be one-half the rate prescribed for the province within which said timber is cut.

SEC. 18. The Chief of the Bureau of Forestry, with the approval of the Secretary of the Interior, may designate for sale or disposal, and may sell or dispose of by license from the public forests and forest reserves, stone or earth the removal of which will not be detrimental to the public forests or forest reserves or to the interests which depend upon them. The rates of charge shall be determined by him in each case with like approval.

The Chief of the Bureau of Forestry may, with the approval of the Secretary of the Interior, grant licenses for the removal of such stone or earth, and in such licenses may prescribe such terms, conditions, and limitations, including a minimum amount of stone or earth to be removed within a specified period or periods of time as may be deemed by the Chief of the Bureau of Forestry and the Secretary of the Interior in the public interest, and may provide in such licenses for forfeiture thereof in case of violation of such terms.

SEC. 19. The Chief of the Bureau of Forestry, under regulations to be prescribed by him, with the approval of the Secretary of the Interior, may grant gratuitous licenses for the free use of timber, firewood, gums, resins, and other forest products, and of stone and earth, in reasonable quantities and within definite territorial limits, for domestic purposes, and not for sale, barter, or any other use whatsoever. He may also, within definite territorial limits, similarly prescribe the free use of forest products and of stone and earth for public works: *Provided*, That a gratuitous license for woods of the first group shall not be issued.

SEC. 20. The Chief of the Bureau of Forestry, with the approval of the Secretary of the Interior, may, when the public interests so require, make requisition upon the Bureau charged with public surveys, to proceed to demarcate, establish on the ground, and erect monuments along the boundaries of any public forest or forest reserves; and it shall be the duty of the last-named Bureau to comply with said requisition: *Provided*, That no duplication of work shall be caused by such demarcation: *And provided further*, That the cost of such demarcation shall be defrayed from the revenues of the public forests or forest reserves.

SEC. 21. In order to promote uniformity and cooperation in the forest work of the Philippine Islands and the United States, and to facilitate the comparison of results, the methods of the Philippine Bureau of Forestry in forest measurements, timber tests, silvicultural observations, and other forest work, shall, so far as practicable, and in the discretion of the Chief of the Bureau of Forestry, be based upon the corresponding methods of the Bureau of Forestry of the United States Department of Agriculture.

SEC. 22. No officer or employee of the Bureau of Forestry shall have any pecuniary interest in any forest or in any business in lumber, firewood, gums, resins, or other forest products, or stone or earth, in the Philippine Islands: *Provided*, That this prohibition shall not apply to guards or assistant guards, or to persons temporarily acting as guards or assistant guards.

SEC. 23. Every official, employee, or agent of the Bureau of Forestry is empowered to make arrests without process in or upon the public forests or forest reserves, or territory adjacent thereto, of any person who is committing or attempting to commit any violation of this Act or the regulations established thereunder, and it shall be the duties of governors of provinces, the Philippines Constabulary, and of municipal presidents to assist in making the arrests prescribed in this section when called upon to do so. Where the person or persons found violating the provisions of this Act are members of a non-Christian tribe, they shall be dismissed with a warning in the case of a first offense, but upon conviction of a second offense shall be punished as in this Act provided for violations hereof. When any arrest is made under the provisions of this section without warrant, the official, employee, or agent of the Bureau of Forestry shall obtain a warrant from competent authority at the earliest practicable moment under the circumstances. Prisoners with or without warrant shall in all cases within twenty-four hours, if reasonably practicable, be brought before a judge or justice of the peace having jurisdiction over the offense for examination and release under bail if the offense is bailable.

SEC. 24. Every private owner of forest land shall register his title to the same with the Chief of the Bureau of Forestry. In the absence of such registration, wood cut from alleged private lands and not from public forests or forest reserves shall be considered as cut under license from public forests or forest reserves, and shall be subject to all provisions of this Act and of the regulations established thereunder in such case applicable.

When in his opinion the public interests so require, the Chief of the Bureau of Forestry may make application to the examiner of the Court of Land Registration or the fiscal of the province in which the land lies, for such assistance as may be necessary in the examination of the titles thereof, with a view to their registration in the Bureau of Forestry, and upon the receipt of such application it shall be the duty of the fiscal or examiner of titles, as the case may be, to render the assistance applied for by the Bureau of Forestry.

SEC. 25. The cutting, clearing, or destroying of the public forests or forest reserves, or any part thereof, for the purpose of making calaguins, without lawful authority, is hereby prohibited, and whoever, in violation of this provision, shall cut, clear, or destroy the same, for such purpose, or shall willfully or negligently set fire thereto, shall, upon conviction by a court of competent jurisdiction, be punished by a fine not exceeding a sum equivalent to twice the regular Government charge upon the timber so cut, cleared, or destroyed, and, in addition thereto, by imprisonment not exceeding thirty days, in the discretion of the court.

The cutting, collecting, destroying, or removing of timber or other forest products, stone, or earth from the public forests or forest reserves for any other purpose than making a calaguin, without license, permit, or other sufficient authority, is hereby prohibited, and any person who, in violation of this provision, shall so cut, collect, destroy, or remove the same, by himself, through an agent or employee, or for account of another, shall, in addition to the payment of the regular Government charge on such timber, forest products, stone, or earth, be subject to the payment of an additional sum equivalent to the regular Government charge thereon, which shall be collected as in this Act provided in the case of other Government charges.

SEC. 26. Whenever an exclusive license of any class shall have been issued (to any person, company, corporation, or other association) for the cutting or removing, from the public forests or forest reserves, of timber, firewood, or other forest products, stone, or earth, it shall be unlawful for any other person, company, corporation, or association, while such license is in force, to enter or operate within the territory covered by such exclusive license contrary to the

terms thereof: *Provided*, That the residents within or adjacent to said territory may be permitted to cut or remove timber, firewood, other forest products, stone, or earth for domestic purposes.

If, contrary to the provisions of this section, any person, company, corporation, or other association shall enter upon, and shall cut or remove, or attempt to cut or remove, timber, firewood, other forest products, stone, or earth, said property so attempted to be cut or removed shall be seized as Government property, by the local forest official or other representative of the Forestry Bureau, and the person making the seizure shall promptly notify the holder of the exclusive license affected thereby, and the said property so seized shall be surrendered to him upon the payment of the proper Government charges thereon. Should, however, acceptance of said property and the payment of the charges thereon be refused, it shall be disposed of in the manner provided in section thirty-two of this Act for the disposition of forest products, stone, or earth on which the Government charges have not been paid, and the proceeds turned over to the proper official to whom the Government charges thereon should have been paid.

SEC. 27. No fire for clearing shall be started on private forests, woodlands, or fields adjoining public forests or forest reserves, without written permission first obtained from the local forest officer, or, in the absence of such officer, from the president of the municipality or settlement in which such forests, woodlands, or fields are situated. A copy of said written permission, when given by a president, shall be furnished by him to the local forest officer prior to the burning contemplated, when practicable; and said fires shall, when practicable, be lighted in the presence of such forest officer, president, or other duly authorized municipal official. Any person violating any of the provisions of this section shall, upon conviction, be subject to a fine not exceeding one hundred pesos or by imprisonment not exceeding thirty days, or both.

SEC. 28. Whoever, without authority of law, shall cut, make, manufacture, or have in his possession any Government marking hatchet or other marking implement, or any mark, poster, or other device officially used by officers of the Bureau of Forestry for the marking or identification of timber or other forest products, or any duplicate, counterfeit, or imitation thereof, or who shall fraudulently make or apply a Government mark to timber or any other forest product by means of any authentic or counterfeit Government marking hatchet, implement, mark, poster, or other device, or who shall fraudulently alter, deface, or remove Government marks from logs, stumps, firewood, or other forest products, shall, upon conviction be punished by a fine not exceeding five hundred pesos or by imprisonment not exceeding one year, or both.

SEC. 29. Neglect, unreasonable delay, or falsification in the making of reports, presentation of papers, or in other acts required by the provisions of this Act or the Forestry Regulations, or refusal to make reports, present papers, or to perform other acts required by this Act or the Forestry Regulations, shall, upon conviction, unless otherwise specially provided by law, be punished by a fine not to exceed two hundred pesos.

SEC. 30. Whoever, in violation of the provisions of this Act or of the Forestry Regulations or orders made in accordance herewith, transports, removes or discharges from any ship, boat, raft, car, cart, or other means of transportation, forest products, or stone or earth, or fails to pay the amounts due the Government on forest products, stone, or earth for a period of more than thirty days from the date of the receipt by him or his agent of the order directing the payment of the same, shall, in addition to the regular Government charges thereon, be subject to the payment of the sum of fifty per centum thereof, to be collected as in this Act provided for the collection of other Government charges.

SEC. 31. In the absence of a local forest officer the president of the municipality or settlement within which timber or other forest products are cut or collected shall act in his stead. Any president who, in the absence of a local forest officer, shall neglect, refuse, or unreasonably delay to prepare and sign a statement of timber or other forest products, stone, or earth cut or collected within the territory under his authority, or to inspect firewood or other forest products cut or collected for local use in said territory, or to perform other acts required by the provisions of this Act, shall, upon conviction, be subject to a fine not to exceed fifty pesos; and the Chief of the Bureau of Forestry, with the approval of the Secretary of the Interior, shall prepare and furnish to local presidents the necessary instructions defining their duties under this Act.

SEC. 32. Forest products, stone, or earth on which the Government charges have not been paid as prescribed by law, and which have been seized in accord-

ance with the provisions of this Act, shall be offered for sale at public auction, unless redeemed as hereinafter provided.

Fifteen days after any tax on any forest products, stone, or earth shall have become due and remains unpaid the local forest officer shall prepare and sign a certified copy of the records of his office showing the person or persons delinquent in payment of such taxes, the amounts thereof, and of the costs and additional charges respectively due from him or them. The forest officer thereupon shall proceed at once to seize the forest products, stone, or earth of the delinquent, and, unless redeemed as hereinafter provided, to sell at public auction, at some public place near where such property is seized, as the local forest officer shall determine, so much of the same as shall satisfy the tax, additional charges, and costs of seizure and sale, to the highest bidder for cash, after due advertisement by notice posted at the main entrance of the municipal building in the municipality in which such seizure is made and at a public and conspicuous place in the barrio in which the property was seized, stating the time, place, and cause of sale. The certified copy of the local forest officer's record of delinquents, attested by the secretary of the municipality within which the forest products were seized, approved by the forest inspector or forester in charge of the forest or inspection district, shall be his warrant for thus proceeding, and the purchaser at such sale shall acquire an indefeasible title to the property sold. Within two days after the sale the local forest officer shall make return of his proceedings in writing to the Bureau of Forestry and shall reserve a copy thereof to be kept by him as an official record, which shall also be attested by the municipal secretary: *Provided*, That if there is no bidder, or if the highest bid is only equal to or less than the sum total of the taxes, costs, and additional charges, the Chief of the Bureau of Forestry shall have discretionary power to declare the same sold to the Government in satisfaction of such taxes, costs, and charges, and to invoice said products to the provincial supervisor or to any other public official charged with similar duties, for use in public works. The proceeds of such auction sales shall be paid to the official to whom the Government charges on the same should have been paid, who shall pay any surplus resulting from the sale over and above the tax, costs, and additional charges to the person on account of whose delinquency the sale has been made.

Sec. 33. The owner of forest products seized may redeem the same from the local forest officer or collecting officer at any time after seizure and before sale by tendering to him the amount of the taxes, costs, and additional charges incurred up to the time of tender. The costs to be charged in making such seizure and sale shall embrace only the actual expense of seizure and preservation of the property pending the sale, and no charge shall be imposed for the services of the local forest officer or collecting officer or his deputy.

Sec. 34. Whenever authority is given in this Act for the imposition of any additional charge administratively, any person aggrieved by the imposition of such additional charge may, within twenty days after payment thereof, appeal therefrom to the Court of First Instance of the province in which the additional charge was imposed, and that court shall have jurisdiction, after due hearing, to confirm the imposition of the additional charge or to reverse or modify the same. Judgments of the Courts of First Instance in such cases shall be certified to the Bureau of Forestry, and, when in favor of the taxpayer, such judgment shall also be certified to the Auditor for the Philippine Islands who shall issue a certificate for payment by settlement warrant upon the Insular Treasurer, under the provisions of Act Numbered three hundred fifty-seven, and shall charge the amount of the warrant against the forestry collections of the province and municipality from which the timber was cut or the forest product obtained: *Provided*, That if an appeal from the judgment of the Court of First Instance is taken by the Bureau of Forestry, the Chief of said Bureau shall immediately notify the Auditor, who shall withhold settlement of the account pending final decision of the court.

Sec. 35. From and after May twentieth, nineteen hundred and four, there shall be paid on all timber, firewood, gums, resins, and other forest products, and stone and earth cut, gathered, or removed from all public forests or forest reserves on and after May twentieth, nineteen hundred and four, the respective taxes, costs, and additional charges imposed on such products in this Act. The payment of all such taxes shall be made within thirty days after the date of the receipt by the owner or his agent of the order directing payment, and the payment of the proceeds of auction sales, and of all charges and costs imposed by officers or employees of the Bureau of Forestry, shall be made immediately upon the receipt of the order directing payment, to collectors of internal revenue or to provincial or municipal treasurers, as provided by law. The charges

prescribed by General Orders, Numbered Ninety-two, series of nineteen hundred, office of the United States Military Governor of the Philippine Islands, shall be collected on all forest products cut, gathered, or removed prior to May twentieth, nineteen hundred and four.

Sec. 36. All sums of money mentioned in this Act shall be deemed to be in Philippine currency.

Sec. 37. General Orders, Numbered Ninety-two, series of nineteen hundred, issued by the Military Governor of the Philippine Islands; Act Numbered Two hundred and seventy-four, entitled "An Act prohibiting the unauthorized destruction of timber on public lands;" section twenty of Act Numbered Forty-nine, entitled "An Act providing for the establishment of a civil government for the Province of Benguet;" section eleven of Act Numbered One hundred and nineteen, entitled "An Act extending the provisions of the Provincial Government Act and the Municipal Code to the Province of Occidental Negros;" and section eleven of Act Numbered One hundred and twenty, entitled "An Act extending the provisions of the Provincial Government Act and the Municipal Code to the Province of Oriental Negros," are hereby repealed.

Sec. 38. This Act shall take effect on its passage, except sections eleven, twelve, and thirty-seven, which shall take effect May twentieth, nineteen hundred and four.

Enacted, May 7, 1904.

Acts Relating to Forests and Forest Products.

[Act No. 163.]

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Sec. 2. There is hereby appropriated out of the Insular Treasury from funds not otherwise appropriated a sum sufficient to return to the provincial governments now or hereafter organized under the General Provincial Government Act, all the internal revenue collections made between the first of January, 1901, and the first of July, 1901, in said provinces, in accordance with Section 37 of Act No. 133, one-half to be paid into the provincial treasury and the other half to be paid to the Provincial Treasurer, to be by him distributed to the municipalities in which the same were collected. The authority for payment hereby conferred may be exercised from time to time in partial payments to provincial treasurers until all that is due under Section 37 of Act No. 133 shall be paid. The warrants for the same shall be drawn upon the application of the provincial treasurers in the amounts certified to be correct by the Insular Collector of Internal Revenue, approved by the Insular Auditor. In so far as the manner of payment provided in Section 37 of Act No. 133 is inconsistent with that herein provided, such Section No. 37 is hereby modified.

* * * * *

Enacted, July 13, 1901.

[No. 165.]

AN ACT Prescribing certain duties for collectors of customs, collectors of internal revenue, and provincial treasurers with reference to the collection of taxes on forest products.

By authority of the President of the United States, be it enacted by the United States Philippine Commission, that:

SECTION 1. Any person who desires to ship forest products of whatever sort to a foreign port shall produce to the Collector of Customs at the port of shipment a receipt from a forestry official showing that the forestry taxes on these products have been paid, unless such products are taken from private land the title to which has been properly registered in the office of the Forestry Bureau at Manila, in which case the shipper shall produce a certificate from a forestry official to this effect.

Sec. 2. No Collector of Customs shall clear a vessel having on board forest products of any sort from any port of the Philippine Islands for a foreign port

until the shipper of such products has complied with the provisions of Section 1 of this act.

SEC. 3. Every Collector of Internal Revenue and every Provincial Treasurer in the Philippine Islands shall make to the Chief of the Forestry Bureau an itemized monthly report of all moneys received by him for taxes on forest products, giving for each payment the date when made, the name of the payor, the number of the forestry official's order under which the payment is made, the nature of the product on which the payment is made, the name of the province in which it was taken and the amount of the payment.

* * * * *

Enacted, July 13, 1901.

[No. 218.]

AN ACT Creating a Bureau of Public Lands.

By authority of the President of the United States, be it enacted by the United States Philippine Commission, that:

SECTION 1. There is hereby created under the Department of the Interior an Insular Bureau of Public Lands which shall have charge of all the public domain of the government of the Philippine Islands, except so far as control thereof may be necessary to the functions of the Forestry and Mining Bureaus which shall not be affected by this act. Under the supervision of the Bureau of Public Lands shall be executed all instruments for the sale or conveyance of the public lands when authorized by law.

* * * * *

Enacted, September 2, 1901.

[No. 527.]

AN ACT Amending the Municipal Code and the Provincial Government Act and the acts amendatory thereof, so far as concerns the collection and disbursement of internal revenue taxes.

By authority of the United States, be it enacted by the Philippine Commission, that:

SECTION 1. Section eighteen of Act Numbered Eighty-three, entitled "The Provincial Government Act," as amended by Act Numbered One hundred and thirty-three, entitled "An Act to amend the Provincial Government Act, Numbered Eighty-three," is hereby amended to read as follows:

"SEC. 18. In all provinces organized under this Act, the industrial tax, the stamp taxes, and all other taxes known as inland revenue taxes, except taxes on forest products from government lands, shall cease to be levied and collected as heretofore for the Central Government of the Archipelago from and after the thirtieth of June, nineteen hundred and one, and shall thereafter be collected as provincial and municipal taxes by the provincial and municipal treasurers, until such time as an internal-revenue law shall be enacted by the Commission. One-half of the taxes so collected shall be paid into the provincial treasury and the other one-half shall be paid into the treasuries of the respective municipalities in which they shall be collected. The treasurer of each province shall, either in person or through his deputies, or through the municipal treasurers of the province, collect, subject to the forestry regulations, the Government valuations on forest products from public lands, and each collector of internal revenue and each provincial treasurer in the Philippine Islands shall make to the Insular Auditor and to the Chief of the Forestry Bureau itemized monthly reports of moneys received by him from taxes on forest products, giving for each payment the date when made, the name of the payor, the number of the forestry official's order under which the payment is made, the nature of the product on which the payment is made, the name of the province in which it was taken, and the amount of the payment. All moneys received by any provincial treasurer or collector of internal revenue from taxes on forest products shall be covered into the Insular Treasury by him. Collections derived from forest products on Government land under the forestry regulations shall be

regarded for the purposes of this section as collected in the province where the timber is cut or the forest products obtained, although actually collected at Manila or some other place. The net amount of the collections under the forestry laws made in the provinces and in the city of Manila shall be, after July first, nineteen hundred and two, returned pro rata to the provinces to which they respectively relate, after the entire expenses of conducting the Forestry Bureau and the service under its control shall have been deducted from the gross receipts. Such return shall be made as soon as the accounts of collections and disbursements shall have been settled and adjusted by the Auditor. Such returns of forestry collections to the provinces shall be made upon certification of the amount due by the Auditor, by settlement warrant, and for this purpose an appropriation of the sums so required in hereby made. One-half of all sums so returned to each province shall be covered into the provincial treasury and shall be available for all lawful provincial expenses. The remaining one-half shall be divided among the several municipalities from which came the forest products on which the original collections were made, pro rata to the amounts originally collected on products from each municipality. In the case of internal revenue collected in unorganized provinces and returned to them for disbursement upon organization, and in that of collections on forest products made at Manila where it is possible from the records in the office of the Acting Collector of Internal Revenue, the Forestry Bureau, and the provincial treasurer to determine to what municipality such funds belong, the provincial treasurer shall transfer such funds to the province, and if at any time the provincial treasurer shall ascertain to what municipality such funds were due he shall reimburse such municipalities for the amounts respectively due them from provincial funds. The stamps required by law for the collection of taxes shall be furnished to provincial treasurers by the Insular Treasurer, who shall obtain the same from the City Assessor and Collector of Manila in sufficient quantities for the purposes of this section, giving a proper receipt therefor. The provincial treasurer receiving the stamps shall rereceipt for the same to the Insular Treasurer. The Insular Treasurer shall render a monthly account-current to the Insular Auditor of the stamps furnished by him to provincial treasurers, supporting the same by proper vouchers. Provincial treasurers shall render for each month a report of stamps sold and stamps on hand to the Insular Auditor."

Sec. 2. Section ninety-seven of Act Numbered Eighty-two, entitled "The Municipal Code," paragraph (c) of section one of Act Numbered Three hundred and seventy-four amendatory thereof, and all other acts or parts of acts in conflict with the provisions of this Act, are hereby repealed.

* * * * *

Enacted, November 19, 1902.

[No. 530.]

AN ACT Defining the jurisdiction of the civil and of the military authorities over lands reserved by the President of the United States for military purposes.

By authority of the United States, be it enacted by the Philippine Commission, that:

SECTION 1. No licenses shall be granted for the sale of or dealing in any intoxicating liquors on any public land reserved by the President of the United States for military purposes in the Philippine Islands.

Sec. 2. The military authorities shall have the right to reject any intruder or trespasser on any public lands reserved by the President for military purposes in the Philippine Islands, and to suppress open breaches of the peace and abate nuisances thereon.

Sec. 3. No branch of the Civil Government in force on or over any public lands reserved by the President for military purposes, and no civilian residents thereon, shall interfere with military administration or the use of such lands for military purposes.

Sec. 4. The personal property of persons employed in the military service of the United States in the Philippine Islands and used by them incident to said service shall be exempt from all taxation under the laws in force in said Islands.

Sec. 5. No mining claims shall be located by any person on any public lands reserved by the President for military purposes in the Philippine Islands.

SEC. 6. Every person who unlawfully cuts, or aids, or is employed in unlawfully cutting, or wantonly destroys, or procures to be wantonly destroyed, any timber standing upon lands of the United States, which in pursuance of law may be reserved or purchased for military purposes in the Philippine Islands, or removes any other public property, shall, upon conviction, be fined for each offense a sum not exceeding five hundred dollars, or be imprisoned for a period not exceeding twelve months, or both, in the discretion of the court.

SEC. 7. No arrest of any officer, soldier, or civilian employee, in the military service of the United States on any military reservation, camp, or barracks, shall be made except on warrant in due form in writing and served upon the commanding officer thereof.

SEC. 8. All laws or parts of laws in force in the Philippine Islands not inconsistent with military use of any public lands reserved by the President for military purposes shall be in full force and effect over said lands.

* * * * *

Enacted, November 24, 1902.

[The Public Land Act—No. 926.]

SEC. 2 (see page 462)

SEC. 13 (see page 464)

SEC. 26 to 31 inclusive (see pages 466, 467)

[No. 1032.]

AN ACT Providing that the salaries of provincial and municipal officers and employees shall be fixed in Philippine currency at the same amounts now allowed by law to be fixed in Mexican currency, and that the assessment, imposition, and collection of taxes, public dues, and impositions now authorized and made payable by law in Mexican currency shall be made payable in Philippine currency on the basis of one Philippine peso for one Mexican dollar, and that all compensation for insular or provincial officers and employees and all official fees and charges now made by law payable in Mexican currency shall be payable in Philippine currency on the basis of one Philippine peso for one Mexican dollar.

By authority of the United States, be it enacted by the Philippine Commission, that:

SECTION 1. All provincial treasurers, municipal councils, and other authorities of every kind in the Philippine Islands who have authority to fix the salaries of municipal officers and employees are hereby authorized and directed to fix such salaries in Philippine currency, instead of in Mexican currency, anything in existing law to the contrary notwithstanding. All such salaries heretofore fixed in Mexican currency shall, after January first, nineteen hundred and four, be payable in Philippine currency at the same amounts as now provided, by law in Mexican currency, and shall remain fixed at such amounts in Philippine currency until changed by competent authority.

SEC. 2. On and after the first day of January, nineteen hundred and four, all public dues, internal revenues, industrial, stamp, forestry, cedula, license, and municipal taxes of every kind, and all fines and penalties imposed by courts or other authorities, shall be imposed, assessed, and collected in Philippine currency instead of in Mexican currency as now provided by law, and at the same amounts in Philippine currency as are now fixed by law for such taxes, fines, and penalties in Mexican currency: *Provided, however,* That Spanish-Filipino coins may be received in payment of such taxes, fines, and penalties at the official ratio that shall from time to time prevail until such time as Spanish-Filipino coins shall by law cease to be receivable for public dues.

SEC. 3. On and after January first, nineteen hundred and four, all compensation that is provided by law for insular or provincial officers and employees, wherever such compensation is fixed in Mexican currency, and all official fees and charges, insular, provincial, or municipal, wherever such fees are fixed in Mexican currency, shall be payable in Philippine currency on the basis of one Philippine peso for one Mexican dollar.

* * * * *

Enacted, December 28, 1903.

[Act. No. 1189.—The Internal Revenue Law.]

* * * * *

SEC. 147. Of the taxes assessed and collected by virtue of the provisions of this Act the following shall inure to the Insular Treasury and be devoted wholly to the purposes of the Insular Government, except such portion thereof as is in this article set apart for the use and benefit of the provincial and municipal governments:

First. All stamp taxes.

* * * * *

Tenth. All taxes on forestry products.

* * * * *

SEC. 150. Ten per centum of all revenues accruing to the Insular Treasury by virtue of the provisions of this Act shall be set apart by the Insular Treasurer for the benefit of the several provincial governments for general provincial purposes, and said sum of ten per centum shall be apportioned among the several provinces in proportion to their respective populations as shown by the census of nineteen hundred and three. Fifteen per centum of all the revenues accruing to the Insular Treasury by virtue of the provisions of this Act shall be set apart by the Insular Treasurer for the benefit of the several municipal governments for general municipal purposes in accordance with law, and said sum of fifteen per centum shall be apportioned among the several municipalities in proportion to their respective populations as shown by the census of nineteen hundred and three: *Provided*, That of the fifteen per centum of the revenue set apart by this section for the benefit of the several municipal governments, one-third thereof shall be utilized solely for the purposes of the maintenance of free public primary schools in the respective municipalities, including the payment of teachers, the building of schoolhouses, and other expenditures appertaining to the maintenance of the public schools. For the purposes of this Act the city of Manila shall be deemed as a municipality and as a province, so that in the apportionment to the several provinces and municipalities it shall receive on a basis of twenty-five per centum. The distribution of funds to the provinces and municipalities under this section shall be made once every three months, beginning with the first day of January, nineteen hundred and five.

SEC. 151. Wherever in this Act it is prescribed that a duty shall be performed by the provincial treasurer and his deputies, the duty so imposed on the provincial treasurer and his deputies shall be performed in the City of Manila by the City Assessor and Collector and his deputies.

* * * * *

Enacted July 2, 1904.

[No. 1544.]

AN ACT Exempting from internal revenue taxes all timber and other forest products for use in the actual construction and equipment of certain railway lines in the Philippine Islands.

By authority of the United States, be it enacted by the Philippine Commission, that:

SECTION 1. Timber and other forest products of all kinds, to whatever group they may belong, when cut or gathered under proper licenses issued by the Bureau of Forestry for use (and which shall, in fact, be so used) in the construction and equipment of the railways undertaken by the grantees under Acts Numbered Fourteen hundred and ninety-seven and Fifteen hundred and ten, pursuant to authority conferred by said Acts, shall be exempt from all internal revenue taxes prescribed by Act Numbered Eleven hundred and eighty-nine, as amended, upon the presentation to the Collector of Internal Revenue, or his authorized agent, of a certificate in writing, in the form to be prescribed by the Collector of Internal Revenue, and signed by the representative or duly authorized agent of the railway company purchasing the timber or other forest products. The certificate shall show, in substance, that the material for which this exemption is sought is to be used in the construction and equipment of a line of railroad between certain points, naming the same; that no other use or disposition of the material will be made or permitted; and that if any other use or disposition thereof shall be contemplated, immediate notice thereof shall be given to the Collector of Internal Revenue, and the material in question to be held subject to his order.

SEC. 2. The exemptions provided by this Act shall not be construed to extend or apply to materials of any kind purchased from funds other than those of a railway company mentioned in section one hereof, or of one of its contractors or subcontractors, nor to materials which are intended for the personal use of officers or employees of any such company, contractor or subcontractor, whether the same are purchased from funds of such company, contractor, or subcontractor or not.

SEC. 3. The provisions of this Act shall not apply or extend to any railway line, nor to any materials therefor, after the line shall have once been officially declared to be constructed and equipped.

SEC. 4. Any company or corporation violating any of the provisions of this Act or any of the terms of the certificate prescribed in section one hereof shall be punished by a fine of not less than double the amount of the taxes provided by law upon the timber or other forest products which may be the subject of the violation, and not more than ten times the amount thereof in the discretion of the court; any officer, representative, agent, or employee of any company or corporation, or any other person, violating any of the provisions of this Act or any of the terms of the certificate prescribed in section one hereof shall be deemed guilty of a misdemeanor, and shall be punished by imprisonment for not less than one nor more than six months or by the fine above prescribed, or both, in the discretion of the court.

* * * * *

Enacted, October 18, 1906.

[No. 1407—Reorganization Act.]

* * * * *

SEC. 9. (a) The Bureau of Forestry shall have one chief, who shall be appointed by the Governor-General, by and with the consent of the Philippine Commission, and who shall be known as the Director of Forestry. The Director of Forestry shall perform the duties now imposed by laws in force on the Chief of the Bureau of Forestry, and such other duties as may be required of him by this Act as Director of Forestry. The Salary of the Director of Forestry shall be eight thousand pesos per annum.

(b) (*As amended by Act No. 1800*). For the period of five years from the date of the passage of this Act any resident of the Philippine Islands may cut or take, or hire cut or taken, for himself from the public forests, without license and free of charge, such timber, other than timber of the first group, and such firewood, resins, other forest products, and stone or earth, as he may require for housebuilding, fencing, boat building, or other personal use of himself or his family. Timber thus cut without license shall not be sold nor shall it be exported from the province where cut, except as hereinafter authorized: *Provided*, That the Director of Forestry, with the approval of the Secretary of the Interior, may set aside for the use of the inhabitants of any municipality, township, or settlement a suitable tract of forest, which shall be known as a communal forest, and the privilege of cutting, taking, or hiring cut or taken from the public forest without license and free of charge such timber other than timber of the first group, and such firewood, resins, other forest products, and stone or earth, as any resident of the municipality may require for housebuilding, fencing, boat building, or other personal use of himself or his family, shall then be exercised only within the communal forest thus set aside. Such communal forests shall be on lands more suitable for forestry than for agriculture. They shall be administered by the Director of Forestry, subject to the approval of the Secretary of the Interior, in such a way as to assure the people having rights therein of a continued supply of forest products necessary for their home use, and to this end the Director of Forestry may prescribe the species and sizes of trees that may be cut and the manner of removal of such trees or other forest products, stone, or earth. When there is no public forest land conveniently situated within the limits of a province to which any municipality, township, or settlement belongs, and when such public forest land exists in a neighboring province, it may be set aside as a communal forest for such municipality, township, or settlement, and timber cut in it without a license may then be exported from such communal forest to the municipality, township, or settlement in question. Exploitation of a communal forest for revenue shall be allowed only when the best interest of such forest demands cutting in excess of

local needs. Such exploitation for revenue shall be carried on under license in the same manner and subject to the same conditions as in public forests. On satisfactory showing that a resident of any municipality, township, or settlement for which a communal forest has been set aside will erect a house of strong materials the Director of Forestry may issue or cause to be issued to such resident a written permit for the cutting within such communal forest of the requisite amount of first-group timber without charge, and such cutting shall then be lawful. Subject to the approval of the Secretary of the Interior, the Director of Forestry may issue rules for carrying out the provisions of this paragraph, and such rules may provide for the suspension or withdrawal from any person of the free-use privilege herein provided as a punishment for the violation of the Forest Act, as amended, the forest rules, or of the provisions of this paragraph and the rules promulgated hereunder.

Dealers in forest products, stone, or earth taken from the public forests shall pay the charges prescribed in article fourteen of Act Numbered Eleven hundred and eighty-nine, entitled "The Internal Revenue Law of Nineteen hundred and four," on all such products taken by them. Every person, firm, or company whose business it is to sell timber or other forest products, stone, or earth shall be regarded as a dealer in such products within the meaning of this Act.^a

(c) The functions heretofore performed by employees of the Bureau of Forestry and by presidents of municipalities or settlements, in measuring and manifesting timber or other forest products, stone, or earth taken from the public forests, in fixing the Government charges to be paid thereon, and in collecting delinquent taxes thereon, shall be discharged hereafter by employees of the Bureau of Internal Revenue under such rules and regulations as the Director of Internal Revenue may prescribe and the Secretary of Finance and Justice approve.

(d) Unless otherwise provided by this Act, the Bureau of Forestry, in addition to the duties and services required by this section, shall perform the duties and render the services now prescribed by law for the Bureau of Forestry.

* * * * *

Enacted Oct. 26, 1905.

Opinions of the Attorney-General.

MILITARY AND NAVAL RESERVATIONS; APPLICATION OF PHILIPPINE FORESTRY LAWS.

MANILA, December 2, 1905.

SIR: Pursuant to your indorsement upon the attached papers, I have the honor to render an opinion upon the question whether the Philippine forestry laws are applicable to lands within the military and naval reservations.

The question of the jurisdiction of the civil authorities and the operation of the laws of the Philippine Commission over lands reserved for military and naval purposes was fully discussed in my opinions dated September 9, 1902, and September 13, 1902, published in Volume I, Opinions of the Attorney-General, pages 326 and 332, respectively.

I do not deem it necessary to review the authorities therein cited, but shall merely reaffirm the conclusions therein reached, namely, that the Philippine Commission unquestionably has authority to enact general laws extending over the military and naval reservations in the Philippine Islands. These opinions are in conformity with the views of the Secretary of War and the Judge-Advocate-General of the Army, as shown by the cablegram of the Secretary of War to the Governor-General, dated at Washington, December 22, 1904, in which he uses the following language:

"The theory that the President by the establishment of a military or naval reservation withdraws the reserved lands from the operation of the local law is erroneous. The Commission may find it conducive to the efficient administration in some cases to vest certain powers in the military or naval authorities of such reservations, but the powers so conferred should be exactly defined and strictly limited by statute."

The Forest Act, No. 1148, was enacted by the Commission on May 7, 1904. The purpose of said act, as stated in its title, is to regulate the use of the *public forests and forest reserves* in the Philippine Islands. Said act has been amended by section 9 of Act No. 1407, but the amendments do not affect the question here presented.

^a See Sec. 12, page 581.

Section 2 of said Forest Act provides:

"The *public forests* and *forest reserves* of the Philippine Islands shall be held and administered for the protection of the public interests, the utility and safety of the forests, and the perpetuation thereof in productive condition by wise use; and it is the purpose of this act to provide for the same."

Section 3 of said act provides:

"The *public forests* shall include all *unreserved public lands* covered with trees of whatever age."

Section 4 of said act provides:

"Upon the recommendation of the Chief of the Bureau of Forestry, with the approval of the Secretary of the Interior, the Civil Governor may set apart *forest reserves* from the public lands, and he shall by proclamation declare the establishment of such reserves and the boundaries thereof, and thereafter such *forest reserves* shall not be entered, sold, or otherwise disposed of, but shall remain as such for forest uses, and shall be administered, except as provided in this section, in like manner as the public forests under this act: *Provided*, That the Civil Governor may in like manner by proclamation alter or modify the boundaries of any forest reserve from time to time, or revoke any such proclamation, and upon such revocation such forest reserve shall be and become part of the public lands as though such proclamation had never been made."

From the title of said act and from its provisions it appears to have been the intention of the Commission that it should apply only to *public forests* and *forest reserves* in the Philippine Islands as those terms are defined or described in said sections 3 and 4 of the Forest Act.

It is clear that military and naval reservations are not "forest reserves" within the meaning of that term as it is described and used in the Forest Act. Whether lands within the bounds of military and naval reservations are included within the term "public forests" depends upon the meaning to be given to the words "unreserved public lands" as used in said section 3 of the Forest Act.

The words "public lands" are habitually used in our legislation to describe those lands belonging to the Government which are subject to sale or other disposition under general laws. (See *Newhall vs. Sanger*, 92 U. S., 761.)

Laws relating to public lands do not extend to lands which have been previously appropriated or preserved for special uses, unless they are specifically mentioned in the law itself; and whenever a tract of land has been once legally appropriated to any purpose, from that moment the land thus appropriated becomes severed from the mass of public lands; and no subsequent law or proclamation with reference to the public lands shall be construed to embrace it or to operate upon it. (See *Wilcox vs. McConnell*, 13 Pet., 498, 513; 28 Am. & Eng. Enc. of Law, pp. 222-223, and authorities cited.)

In the case of the *United States vs. The Tygh Valley Land and Live Stock Company* (76 Fed., 693, 694) the court said:

"There is a clear distinction between public lands and lands reserved from sale and other disposition under general laws; such a reservation severs the lands so reserved from the mass of the public domain, and appropriates it to a public use. * * * The reservation of the lands in question is an appropriation to a special public use and is, therefore, a disposal of them so far as the public domain is concerned."

The supreme court of Utah, in the case of *The United States vs. Elliot* (26 Pac. Rep., 1118), held that a reservation of lands for school purposes for the use of the people of a Territory or State is, in effect, a grant, and that the title passes as soon as the lands are surveyed.

It is a rule in the construction of statutes, that where the legislative branch of the Government has reproduced language in statutory enactments which has been judicially construed, it must be taken as using the words in accordance with the judicial construction previously given them, unless a contrary reason plainly appears from the other language used. (*The Abbotsford*, 98 U. S., 440; *United States vs. Elliot*, 26 Pac., 1118.)

I am, therefore, of the opinion that the words "*unreserved public lands*," as used in section 3 of said Forest Act, must be literally construed, and that they refer to lands belonging to the Government not appropriated or reserved for any special use, but are subject to sale or other disposition under the general land laws; that all public forests must be public lands; that the military and naval reservations, having been previously reserved for special uses, are not public lands, and for that reason can not be public forests, within the meaning

of those words as used in the Forest Act. Hence, the provisions of said act are not applicable to any lands reserved for military or naval purposes or for any other special public use whatsoever.

Section 6 of Act No. 530 was evidently enacted by the Commission with a view to the protection of growing trees and timber on military reservations. Said section is as follows:

Every person who unlawfully cuts, or aids or is employed in unlawfully cutting, or wantonly destroys, or procures to be wantonly destroyed, any timber standing upon lands of the United States which in pursuance of law may be reserved or purchased for military purposes in the Philippine Islands, or removes any other public property, shall, upon conviction, be fined for each offense a sum not exceeding five hundred dollars or be imprisoned for a period not exceeding twelve months, or both, in the discretion of the court.

Very respectfully,

L. R. WILFLEY, *Attorney-General*.

The SECRETARY OF THE INTERIOR.

The Forest Regulations.

These regulations are established in accordance with the provisions of The Forest Act (No. 1148).

I. (a) Forest reserves differ from public forests in that the former are exempt from entry (except for mining claims) and sale.

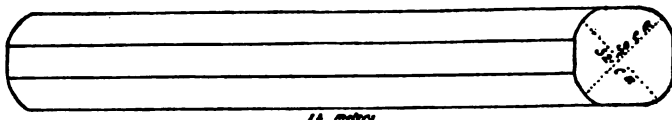
(b) Licenses will be issued for the cutting, collection, and removal of forest products from forest reserves. The operations of licenses on forest reserves will be subject to the constant and personal supervision of the officers in charge.

II. (a) Land will be considered more valuable for agricultural than for forest purposes if worth more per acre cleared than are land and trees together when not cleared.

(b) Persons who desire to enter agricultural land in any public forest, in accordance with the provisions of section seven of The Forest Act, must, before making such entry, obtain from the Chief of the Bureau of Forestry, a certificate setting forth that said land is more valuable for agricultural than for forestry purposes and is not required by public interests to be kept under forest. Blank forms of application for such certificate will be supplied by the Bureau of Forestry on request.

III. Sites for sawmills or timber depots not exceeding four hectares in extent may be leased to holders of timber licenses for periods of not more than twenty years, under such property terms, not inconsistent with the provisions of section nine of The Forest Act, as may be deemed reasonable by the Chief of the Bureau of Forestry, approved by the Secretary of the Interior, and included in each instance in the lease. Blank forms of application for such leases may be obtained from the Bureau of Forestry.

IV. The volume of approximately octagonal logs (four sides being hewn and the other four unhewn) will be ascertained by multiplying eight-tenths of the square of the average diameter connecting the two pairs of opposite unhewn sides of the smaller end and multiplying the result by the length.



Example: Average diameter between opposite unhewn sides of smaller end, 51 centimeters; length, 14 meters. $.51 \times .51 \times .8 \times 14 = 2.923$ cubic meters.

V. In the measurement of a log having an eye-hole, or a rope hole in one end, the length taken will be the distance from such hole to the more distant end of the log: *Provided*, That if such hole be more than thirty centimeters from the nearer end of the log, thirty centimeters only will be deducted from the full length of the log in estimating the length for the purpose of determining its cubic contents.

VI. The volume of pieces of timber which come to a point or nearly to a point at one end, will be determined by multiplying the square of the average diameter by eight-tenths and the result by the length; one-half of the diameter of the large end will be considered the average diameter.

VII. Pieces of wood more than one and one-half meters in length and fifteen centimeters in diameter will be designated as timber.

VIII. In determining the Government charges on minor forest products other than firewood—i. e., charcoal (carbon vegetal), gums (gomas and gutapercha), resins (almaciga and breas), wood oils (balao), dyewoods (sibucan, maderas, tintoreas), dyebark (nigue), and tanbark (cascalote)—the actual value at the market nearest the forest where the product is gathered will be taken as the "actual market value." The following weights and measures will be used in manifesting such minor forest products:

The metric quintal for gums, resins, and dyewoods.

The liter for wood oils.

The cubic meter for charcoal.

Tanbark and dyebark will be estimated by the thousand pieces, provided that where the pieces are not of uniform size or are so small as to make their counting burdensome, the metric quintal may be used.

GENERAL PROVISIONS RELATIVE TO LICENSES.

IX (a) Licenses issued under the provisions of The Forest Act will entitle the holders for certain fixed periods of time to enter upon definite tracts of public land and obtain therefrom, under conditions stated in the licenses, the material designated therein, but will not convey any further right or authority.

(b) Licenses to cut, collect, and remove timber, firewood, gums, resins, or other forest products from public forests and forest reserves will, with the approval of the Secretary of the Interior, be granted by the Chief of the Bureau of Forestry: *Provided*, That special authority to grant licenses for small amounts of forest products may be given by the Chief of the Bureau of Forestry to foresters, assistant foresters, inspectors, and assistant inspectors. They will be of the following four general classes:

(1) *License agreements*, which will provide for the exclusive privilege of cutting, collecting, and removing forest products for a period not to exceed twenty years over areas of public forest larger than those granted in ordinary licenses.

These agreements will provide certain conditions, limitations, and restrictions, including a minimum amount of timber to be cut during the first year, and methods of cutting and hauling the same to prevent undue injury to the forest, responsibility of agents and employees, and the charges to be collected on forest products.

(2) *Miners' licenses*, which will provide for the cutting, collecting, and removing of timber from the public forests or forest reserves for use in developing the mines mentioned in the licenses. The timber so cut to be paid for at one-half the ordinary Government charges on such timber.

(3) *Gratuitous licenses*, which will provide for the cutting, collecting, and removing of forest products from public forests and forest reserves free of charge. Such licenses may be granted under certain conditions, restrictions, and limitations to needy residents, miners, or to officials for use in public works.

(4) *Ordinary licenses*, which will provide for the cutting, collecting, and removing from public forests and forest reserves of forest products on which the full charges prescribed in section 12 of The Forest Act are due.

(c) Every license issued will be delivered to the licensee attached within the covers of a book containing a copy of The Forest Act, of these regulations, and of any special rules applicable to said license, together with lists of the forest reserves and of protected areas, and such other information as may be deemed of value by the Chief of the Bureau of Forestry.

(d) In granting licenses covering given forest tracts or other tracts in their immediate vicinity, preference will be given to persons to whom licenses have previously been granted and who have obeyed the law and regulations and have aided in protecting the forests; to residents of municipalities or settlements in which the timber or other forest products to be collected are situated; to applicants for small amounts of timber or other forest products for their own immediate use; and to persons or associations of persons contemplating the employment upon a considerable scale of modern machinery and logging methods.

(e) Licenses will ordinarily be granted for a period of one year, except in cases where special cause is shown for granting them for a longer period.

(f) The number of licenses granted in each province will be limited, and will depend upon the forest conditions in the province and the needs of the people.

(g) No license will be granted except upon the express condition that the licensee assumes responsibility for all the acts of his agents.

APPLICATIONS FOR LICENSES.

X. (a) Applications for licenses must be made on official forms, which will be furnished on request by an executive officer of the Bureau of Forestry or by the Chief of the Bureau, and must contain the following information:

- (1) The class of license desired.
- (2) The kinds and amounts of timber or other forest products applied for.
- (3) The name, age, citizenship, residence, and occupation of the applicant.
- (4) A statement of former licenses granted to him or to any corporation, partnership, or association of persons with which he has been connected.
- (5) The amount of forest products gathered under last license granted applicant, if any.
- (6) Facilities for logging.
- (7) Amount of capital applicant has available and purposes to employ in operations under the license if granted.
- (8) Applicants for gratuitous licenses must state in detail the use to be made of the forest products for the taking of which a gratuitous license is requested, and any person making use of such forest products other than that stated in the license will be proceeded against under the provisions of section twenty-nine of The Forest Act.
- (9) Applications for gratuitous licenses to cut timber for public works must be forwarded by the local forest officer to the office of the person, if any, discharging the duties of provincial supervisor for the province in which the forest products for the taking of which license is requested are situated.
- (10) Residents of Manila who desire licenses to gather forest products in the provinces may file their applications in the Manila office.
- (11) When application is made for a license by an incorporated company, a certified copy of the articles of incorporation must be submitted with such application.

LICENSE AGREEMENTS.

XI. (a) A license agreement will be granted only for territory where extensive cutting, extending over a period of years can be allowed and where logging operations can be personally supervised by forest officers. A minimum annual cutting will be required, the amount so required to be cut depending upon the forest conditions in the territory covered by the license and the extent of the territory. Should the amount of timber cut be less than that prescribed in the license agreement, the Chief of the Bureau of Forestry may reduce the area of timber land covered by the license.

GRATUITOUS LICENSES.

XII. (a) Gratuitous licenses will be granted as follows:

- (1) A private gratuitous license for a needy resident will be issued only upon the certification of his need by the president of the municipality or settlement in which the applicant resides, or upon that of the local forest officer, and upon the sworn agreement by such applicant that he will employ the timber or use the forest products for which he applies solely for his own use and benefit and will not sell the same or dispose of it in any other manner than that authorized in the license. A private gratuitous license may be granted for not more than thirty cubic meters of timber of the second, third, or fourth groups. The amount of timber granted by gratuitous license to a needy resident will depend to some extent upon the abundance of bamboo in the vicinity of the applicant's residence.
- (2) A public gratuitous license for timber to be used in public works, entitling the holder free of charge to take such amount of timber as may be needed in the public works desired.
- (3) Miner's gratuitous license. (See Regulation XIII.)
- (b) If any person holding an ordinary license cuts or removes timber from public forests or forest reserves for a person holding a gratuitous timber license, such ordinary license may be forfeited. A gratuitous license will not be issued to a holder of an ordinary license of the same class. Holders of gratuitous licenses are prohibited from giving away or selling any wood or other forest products cut thereunder. Wood or other forest products cut must be used for the purpose specified in the license and should there be any surplus the regular Government charges may be collected thereon.

(c) Should any person holding a gratuitous license for cutting or gathering forest products for his personal and exclusive use, or for public works, gather a greater quantity than is allowed by the license, or take different classes from those specified, or apply them to different objects from those stated in the license, such products will be considered as taken without a license, and the offender will be compelled to pay thereon the charges prescribed in section twenty-five of The Forest Act.

MINERS' LICENSES.

XIII. A miner's timber license or a miner's gratuitous license will be granted in accordance with the provisions of section seventeen of The Forest Act upon application by the holder, locator, owner, lessee, or operator of a mining claim who submits satisfactory evidence of registration of the claim on which he proposes to use the timber. Timber cut by miners in violation of the Forest Act, forest regulations, instructions or orders of forest officers may be considered as cut without license and charged for at double the full Government rate.

FORFEITURE OF ORDINARY TIMBER LICENSES.

XIV. Holders of ordinary timber licenses will be allowed four months' time within which to begin operations. At the expiration of that period, persons who have taken no advantage of their licenses may, unless good reason be shown, have them forfeited because of such failure to take advantage thereof. In the event of such forfeiture, applicants for timber licenses who are on the waiting list will be notified that they may renew their applications. Forest officers will report monthly on the report of utilization of forest products (Bureau of Forestry Form 17) the names of all holders of ordinary timber licenses who have not made use thereof during the month for which the report is made.

TRANSFER OF LICENSES.

XV. (a) Licenses of all classes may be transferred by authority of the forest officer granting the same, or by that of the Chief of the Bureau, after the person to whom the license is to be transferred has furnished to the officer empowered to make the transfer the information which would be required were he making an original application for a license of the same class. No other mode of transfer will be authorized.

(b) After June thirtieth, nineteen hundred and five, every holder of a license will be required to perform, himself, or through his duly authorized agents or employees, all operations in the forest under the license which he holds. Failure to comply with this regulation may subject the offender to forfeiture of his license.

FIREWOOD FOR HOUSEHOLD USE.

XVI. Firewood may be taken from public forests and forest reserves without license by residents of the vicinity for their own household use.

PRIVATE WOODLANDS.

XVII. (a) The issuance by the Bureau of Forestry of a license to cut or utilize timber or other forest products from public forests or forest reserves does not authorize the gathering of such products from private lands, or from lands claimed as private lands unless specifically authorized in the license.

(b) Registration of titles in this Bureau as provided in section twenty-four of The Forest Act is not necessary in order to protect private lands from licensees claiming the right to cut on public lands. Any such licensee who cuts timber on private lands belonging to another, even though such lands are not registered in this Bureau, may have his license forfeited.

XVIII. Applications for registration of titles to private woodlands must be made on forms which may be had on application at any station of the Bureau of Forestry, and each such application must be accompanied by a map showing approximately the extent and boundaries of the parcel or parcels of alleged private lands containing forest products which it is desired to remove. Each such application and map will be filed in the Bureau of Forestry and evidence of title will be returned to the owner after inspection and report on the lands is made by the local forest officer.

XIX. (a) Before removing forest products from registered private woodlands, the owner or administrator of the same must secure a manifest as provided in Regulation XXII, paragraph (k). He will also present to the proper forest or municipal officer, at the time the statement of forest products is presented for inspection, a receipt or certified copy of a receipt from the Bureau of Forestry showing the proper registration of title to such private woodlands. Any person who fails to so present a proper receipt and manifest will be proceeded against under the provisions of sections eight and thirty of The Forest Act.

(b) Forest products from private woodlands which are not to be removed from the premises of the owner but are to be used thereon, may be cut and gathered without charge on such private woodlands without registering title thereto in the Bureau of Forestry.

THE CUTTING, COLLECTING, AND REMOVAL OF FOREST PRODUCTS.

XX. (a) If a holder of a license cuts or collects forest products in a forest area other than that specified in his license, the products so cut or collected will be considered as taken without license.

(b) All timber selected for felling under any license should be taken from the forest. When timber has been so selected, no nonselected timber may be cut in the forest area covered by such license. If nonselected timber is taken from an area in which timber has been selected, it will be considered as taken without license and charged for accordingly.

(c) Holders of licenses must exercise particular care in cutting, working up, collecting, or transporting timber, firewood, or other forest products to avoid killing or injuring young trees less than forty centimeters in diameter or seedlings, especially those of the first and second groups. Such young trees of the first and second groups must not be cut for use in logging. As the future supply of the forest depends upon preserving young trees of valuable species, failure on the part of the holder of a license to exercise reasonable care to avoid the destruction of such young trees or seedlings may be followed by the forfeiture of his license.

(d) The holder of a timber license of any class may, when the permission of the Chief of the Bureau of Forestry is specifically given in his license, work up the tops of any trees cut for timber into firewood and market the same, free of all Government charges, under such special regulations as the Chief of the Bureau of Forestry in his license may prescribe and the Secretary of the Interior approve.

(e) The Chief of the Bureau of Forestry, in granting any timber license, may require as a condition of granting such license, that the holder shall work up and remove the tops and large branches of trees felled by him.

(f) The height of the stump of any tree cut for timber or firewood must not exceed the diameter of the tree on the stump.

(g) The diameter limit of trees allowed to be cut in any given forest area will vary in accordance with the species of the tree, the condition of the forest, and the requirements of each locality. In general, unless there is specific reason for fixing a specific size, no tree less than forty centimeters in diameter on the stump may be cut for timber, and trees cut for firewood should be at least twenty-five centimeters on the stump.

(h) Whoever fells undersized trees, or trees the felling of which is prohibited by these regulations or special orders, will be considered as cutting without a license and will be compelled to pay the regular charges thereon and the additional charge prescribed in section twenty-five of The Forest Act.

(i) The felling in the public forest or forest reserves of trees from which valuable gums, resins, or oils are extracted will not be allowed.

(j) The gathering of forest products not specially mentioned in these regulations will be authorized by license containing such special conditions as the Chief of the Bureau of Forestry may, after investigation, deem advisable, and the Secretary of the Interior approve.

(k) Round timber forty centimeters or more in diameter at the larger end, and squared timber twenty-two centimeters or more in width or twenty-two centimeters or more in thickness at the larger end will be considered of legal size. Timber of the first group or less than legal size must not be felled, unless such timber has been selected for felling by duly authorized forest officers, provided that these regulations shall not apply to ebony and lanete.

(l) Timber used for levers, skids, parts of timber slides, or otherwise employed in logging, must be of the fourth group, unless proper timber of this sort is wholly wanting within a reasonable distance. Timber so used and left on the ground will be charged for, if of the third group, at the regular rate; if of the second or first groups, at twice the regular rate.

(m) The holder of a license for cutting timber or firewood must advise the local forest officer of the time when and the place where the cutting under such license will begin, and of the places where the wood cut will be piled. Felled timber must be piled in a clear place, in such a manner that measurement thereof may be readily made. The holder of a license must also notify the local forest officer of the names and residences of his representatives, if any. In the event of failure to so notify the proper officer, the products so cut, collected, or removed will be considered as taken without license.

(n) When the cutting or gathering of forests products under any license has been finished, the holder of the license must in writing notify the nearest forest officer of the place where such products are deposited, the classes and amounts of the same, and their destination. He must also state whether he has left any felled timber or any standing selected timber in the area covered by his license, and if so, he must state the amount and classes of such felled or selected timber left in the forest. Any person who fails or unreasonably delays to give such notice may be punished as provided in section twenty-nine of The Forest Act.

(o) Timber cut under a license and not removed from the forest within the period covered by such license will be charged for at the regular rate.

(p) Firewood, except when worked up from tree tops, as provided in section twelve of The Forest Act and in Regulation XX (d) and (e), must be of the third or fourth groups, and if woods of the first or second groups are taken as firewood, the same must be paid for as timber at double the Government rate for timber of these groups.

(q) Wood cut for burning into charcoal must be of the third or fourth groups, and the unauthorized use of woods of other groups for this purpose will subject the holder of the license to payment for the same as timber at double the Government rate for timber of such groups.

(r) All wood employed in the manufacture of charcoal must be paid for before it is burned. After felling trees and before commencing the process of burning for charcoal, the holder of a license must present to the local forest officer, or, in his absence, to the president of the municipality or settlement within which the wood is being piled, an itemized statement of the timber felled and must state where it is being piled. This statement will be verified and the wood valued by such officer or president; payment will be made and manifest will be issued as prescribed in Regulation XXII, paragraphs (b), (f), (h), and (s). After making the payment ordered, the holder of a license may proceed with the burning, but he must exercise care to avoid injury to standing timber, and if any damage results to such timber from his burning operations, said damage will be estimated by the local forest officer and payment therefor will be enforced in accordance with the provisions of the last paragraph of section twenty-five of the Forest Act.

GUMS, RESINS, AND WOOD OILS.

XXI (a) In extracting gums, resins, wood oils, and similar forest products, the holder of a license must make the cuttings or incisions into the trunks of the trees at least twenty-five centimeters above the ground. These incisions should be made with a very sharp instrument and may penetrate the bark and the first layers of sapwood only; they must not exceed twenty-five centimeters in length and must not penetrate the heart wood. When the flow of juice is obstructed at the outer edges of the incisions, the holder of a license will be permitted to recut these edges and to lengthen the cut by twenty-five centimeters, prolonging it upward, provided that the width of the incision shall never exceed eight centimeters. The making of incisions, or the trimming of the edges of incisions already made, or any lengthening of the same will not be permitted during the period from the flowering of the tree to the ripening of its seed. A metal or wooden plate may be placed at the lower part of the incision to facilitate the collection of juice. A vessel may be placed under the incision at the foot of the tree. Any holder of a license violating these provisions may have his license forfeited and must pay double the regular charge for timber on each tree so incised.

(b) Gums, resins, wood oils, and similar forest products may be stored in municipalities, settlements, or other places, at the convenience of the holder of the license, after previous notification to the local forest officer, or in the absence of such officer, to the nearest local municipal authority of the place or places where such products are to be stored.

MANIFESTS.

XXII (a) Native forest products of all kinds will be presumed to belong to the Government until the contrary is proved.

(b) Before using, transporting, or disposing of any native forest product, the owner or his agent must obtain a manifest, authenticated by the local forest officer, provided that where no forest officer can be reached without undue hardship a duly authorized municipal officer may authenticate the manifest. In such cases if the product is to be transported by sea, the holder of a license will present a statement of the product in duplicate to the proper municipal officer, who will verify such statement and affix his seal or stamp of office, if any, and his signature thereto, forwarding one copy to the nearest forest station and returning to the holder of the license the other copy, which will be his authority to transport the product. If the product is to be transported by land or is for local use, the holder of a license in such cases will present a statement of the product in duplicate to the proper municipal officer, who will forward it to the local forest officer, who if it be impracticable for him to inspect the product, will appraise the same at his station and forward an order of payment to the proper municipal officer for delivery to the holder of the license. After payment has been made, the receipt will be forwarded to the local forest officer, who will issue a paid manifest to the party at interest, which will be his authority to dispose of the product. No charge will be made for making or authenticating a manifest. No manifest will be valid on which does not appear the signature of the forest officer or municipal officer duly authorized to sign manifests, and the signature must be accompanied by the stamp or seal of such officer if he has one.

(c) The holder of a license must not load, remove, sell, or use any forest product which has not been paid for, unless he has received express authority to do so from the Chief of the Bureau of Forestry and has given satisfactory guarantee to that official, except as provided in paragraphs (b), (e), and (h) of this regulation.

(d) When the holder of a license agreement or of an ordinary or miners' license has cut and piled his product, he must submit to the nearest forest station a statement of said product on Bureau of Forestry Form Thirteen and one-half, which will be furnished on application to any forest station. Upon receipt of this statement, the local forest officer will verify and appraise the product, taking the signature of the holder of the license on the manifest, which, when affixed, will be understood to indicate that the holder of the license approves the appraisal.

(e) If the product is to be transported by sea to another point in the Philippines, the holder of a license will have the option of paying the Government charges at the point of origin or at the destination of the product.

(f) In case the product is to be transported by sea to another point in the Philippines, and the holder of a license wishes to pay the Government charges at the point of origin, or in case the product is not to be transported by sea, the forest officer will issue an order directing the payment of the Government charges into the nearest provincial or municipal treasury or internal revenue office authorized to receive such payments.

(g) When the holder of a license presents his receipts of payment, the forest officer will take them up and mark the set of manifests paid, delivering to him the originals, which will be his authority to use, transport, or dispose of his product.

(h) In case the product is to be transported by sea to another point in the Philippines and the holder of the license wishes to pay the Government charges at the point of destination, the local forest officer will issue to him an unpaid manifest with a notation thereon to the effect that the product will be paid for at the point of destination. This manifest must be presented to the forest officer at the point of destination within five days after the arrival of the product; that officer will take up the manifest and issue an order of payment on which payment must be made by the holder of the license in the manner prescribed in paragraph (f) of this regulation, and the receipt of payment will be

delivered to the forest officer, who will issue to the holder of the license or his agent an order allowing him to discharge the product. The product will be reappraised at the time of discharge, and the party at interest will be required to pay any excess which may be found upon reappraisal. In case the party at interest is satisfied with the reappraisal, he will sign the reappraisal sheets, the originals of which will be delivered to him.

(i) If, upon reappraisal at destination of the forest products manifested by a municipal officer, an excess of fifteen per centum or more shall be found over the amount manifested, the owner of the license or his agents will be proceeded against as provided in section twenty-nine of The Forest Act.

(j) When the holder of a gratuitous license has cut or gathered forest products, he will, before removing the same, submit a statement of the products to the nearest forest station on a form which will be furnished on application to such station. The local forest officer will take up this statement, verify it, and issue a manifest which will be the authority of the holder of the license to dispose of the products for the purpose specified in the license, provided that in case a forest officer can not be reached without undue hardship, the holder of a license may submit, in duplicate, a statement to the president of the municipality or settlement within which the products have been cut or gathered, which the president will verify, sign, and seal in duplicate, returning one copy to the party at interest and forwarding the other to the nearest forest station.

(k) All owners of private woodlands registered in the Bureau of Forestry in accordance with the provisions of section twenty-four of The Forest Act will, before removing forest products from such lands, proceed as prescribed in the previous paragraph for holders of gratuitous licenses.

(l) Forest products for export will be paid for before shipment, and the manifest must be presented to the collector of customs at the port of shipment. Any person violating this regulation will be proceeded against under the provisions of section thirty of The Forest Act.

(m) If at any time the party at interest should desire to detain a portion of a cargo or load of forest products which has been manifested, or divert a portion to some point other than that of original destination, the local forest officer will, upon application, make an entry of the facts at the foot of the original manifest, returning same to the party at interest, and issuing him in addition a new manifest to accompany the product detained or diverted. In the case of timber a line will be drawn through the entries on the original manifest of the pieces so detained or diverted.

(n) For identification of pieces belonging to different manifests, to aid in the recovery of lost timber, and to avoid fraud, the holder of a license will immediately after felling mark every piece of timber with his special mark which must be previously registered at the forest station. This mark will be indicated in the proper column of the manifest. The pieces of timber embraced in a manifest must also be numbered consecutively, beginning with one, and the corresponding numbers must be entered in the manifest under the proper heading. Where two different lots of timber for the same licensee are shipped on the same vessel, the pieces of the second lot must be marked "1A," "2A," and so forth.

(o) In all manifests of undersized timber, classified in the official tariff as belonging to the first group, except ebony and lanete (and camagon when stripped of its bark and sapwood), there should appear a statement by a ranger or president of a municipality or settlement as to whether such undersized pieces have been cut from trees of a diameter of forty or more centimeters as provided in Regulation XX, paragraph (k).

(p) Forest officers will, whenever practicable, mark with the official marking hatchet both ends of every log of timber manifested.

(q) Failure to present to the nearest forest officer manifests of forest products within five days of arrival at destination will, for the purpose of these regulations, be considered unreasonable delay in the making of a report; and failure to deliver or mail receipts of payment to a forest station or to a forest officer within seven days from date of payment will be considered an unreasonable delay in the making of a report.

(r) Any person found utilizing forest products in violation of section twenty-five or of section thirty of The Forest Act will be directed by the local forest officer to deposit the same with the nearest president of a municipality or

settlement and an order of payment for the same, including the charges and additional charges provided in section twenty-five of The Forest Act, will be issued to him. Upon presentation of a receipt of payment to the local forest officer, the latter will issue a manifest to the party at interest, which will serve as an order on the municipal president for the release of the products and as an authorization for the party at interest to dispose of them.

(s) When a forest officer delivers an order of payment to a holder of a license or his agent, the latter will receipt therefor on the lower part of the original and duplicate. When impracticable to deliver an order of payment to the holder of a license or his agent, the same will be delivered to the proper municipal officer, taking his receipt in the manner above prescribed. The municipal officer will deliver the original to the holder of the license or his agent, causing him to receipt therefor with date of delivery, and advising the local forest officer of the date of delivery to the holder of the license or his agent, or when an order of payment is sent to a municipal officer for delivery to payor he will cause the order to be receipted for, by the licensee or his agent, with date of delivery, and advise the forest station as above.

(t) Each manifest of timber selected for felling by a forester will contain a certification to that effect at the foot of the original, duplicate, and triplicate manifests. Certification will also be made by foresters on manifests of firewood exempted from payment of Government charges under the provisions of paragraph eleven of section twelve of The Forest Act.

(u) Whoever, in violation of the provisions of The Forest Act or of these Regulations, discharges from any ship, boat, raft, car, cart, or any other means of transportation, forest products, or stone, or earth, or fails to pay the amounts due the Government on forest products, or stone, or earth, for a period of more than thirty days from the date of the receipt by him or his agent of the order directing the payment of the same, or transports or removes forest products, or stone, or earth without a manifest, unless he has received express authority to do so from the Chief of the Bureau of Forestry, will, in addition to the regular Government charges thereon, be subject to the payment of the sum of fifty per centum thereof, to be collected on an order of payment, in accordance with section thirty of The Forest Act.

AUCTION SALES.

XXIII. (a) When forest products, stone, or earth are sold at public auction under the provisions of section thirty-two of The Forest Act, within two days after such sale the local forest officer shall forward the duplicate manifest therefor to the Bureau of Forestry at Manila. He will file the triplicate at the forest station and deliver the original to the purchaser. On the original, duplicate, and triplicate manifests the proceedings of the sale will be noted and signed by the local forest officer and attested by the secretary of the municipality or settlement. The local forest officer will make out an order of payment equal to the amount of the bid, and upon presentation of the receipt of payment the manifest of the products sold will be marked paid and turned over to the purchaser, who may then take charge of and remove the products sold. The cost of seizure will include the cost of transporting the products to a secure place.

(b) If after sale there is a balance due the delinquent, the local forest officer will forward a certified copy of the manifest on Bureau of Forestry Form Thirteen and one-half to the collecting officer. Notation of said balance will also be made on the order of payment. If there is nothing due the delinquent, no manifest will be furnished the collecting officer.

(c) Before incurring any expense in transporting to a secure place forest products, stone, or earth, to be sold at public auction, the forest officer making the seizure will, if practicable, confer with the provincial supervisor or other public officer charged with similar duties and learn if he considers the products of sufficient value to warrant incurring the cost of transportation. When such unsold products are turned over to the supervisor or other public officer charged with similar duties, he will sign a receipt therefor on the bottom of the original, duplicate, and triplicate manifests.

ABANDONED FOREST PRODUCTS.

XXIV. (a) All abandoned drift or stranded timber, firewood, bamboo, or other forest products will be considered the property of the Government unless the owner, if there be one, establishes his right and title thereto. Such products will be disposed of by the local forest officer as provided in Regulation XXIII for the public sale of forest products on which the Government charges have not been paid.

(b) If such products are claimed by more than one person the local forest officer may deliver the same to the person whom he deems entitled thereto, or may refer the claimants to the civil courts and deposit the product for safe keeping with the nearest president of a municipality or settlement pending the decision of such courts as to its disposal. Copies of all notices published and of all evidence of title to abandoned forest products will be kept on file at the local forest station. One copy of each such notice must be forwarded to the Chief of the Bureau of Forestry by the local forest officer, together with a memorandum of the action taken in the case by him.

CAINGINS.

XXV. (a) The clearing by fire of grass and brush land and of land in the public forest containing but little timber of inferior species, for the purpose of making "caingins," will be permitted in the following manner only:

Application will be made in writing to the local forest officer, or in his absence to the nearest president of a municipality or settlement, for permission to make a "caingin." The local forest officer, or if there is no local forest officer, a municipal officer designated by the president, will inspect the site of the proposed "caingin," and if satisfied that it can be cleared with fire without injury to adjoining public forests, will give written permission to make the clearing, stating the allowed limits thereof. He will instruct the person desiring to make such "caingin" relative to the proper measures to be taken to prevent fire from damaging adjoining property. If a "caingin" is authorized by a municipal officer, he must file with the local forest officer a report in duplicate of his proceedings, giving location and extent of the "caingin." The local forest officer must forward a copy of this report to the Chief of the Bureau of Forestry.

(b) In every case of violation of the provisions of section twenty-five of The Forest Act, the local forest officer will, if practicable, furnish the prosecuting officer with a detailed statement of the facts relative to such violation.

(c) Owners of private woodlands adjoining public forests and forest reserves will be permitted to make "caingins" thereon in the following manner: Before clearing the land by fire the owner must serve written notice of his intention upon the president of the municipality or settlement in which the land is situated, and upon the local forest officer, if any. Such notice must state the location and extent of the proposed clearing and the place of residence of the owner, and must be accompanied by some evidence of title to the land which it is proposed to clear. Copies of receipt for taxes upon such land for the preceding year will be accepted as evidence of title. Upon receipt of such notice, the local forest officer, or a municipal officer designated by the municipal president for this purpose, will visit the site of the proposed clearing and inspect the land. If satisfied with the evidence of title submitted and that the making of the "caingin" will not endanger adjoining public property, the forest officer or municipal officer will give written permission to make the proposed clearing. He will fully instruct the owner as to the proper measures to prevent the fire from damaging adjoining property. Copies of reports of proceedings relative to the making of "caingins" on private woodlands will be made and filed as prescribed relative to reports concerning "caingins" on public lands in paragraph (a) of this regulation.

(d) All fires employed in making "caingins" will, when practicable, be lit in the presence of the local forest officer or duly authorized municipal officer.

(e) The use of fire in felling timber or opening roads in public forests or forest reserves will not be allowed.

(f) Any person violating this regulation will be proceeded against under the provisions of section twenty-seven of The Forest Act.

"SEC. 3570. The tables in the schedule hereto annexed shall be recognized in the construction of contracts, and in all legal proceedings, as establishing in terms of the weights and measures now in use in the United States, the equivalents of the weights and measures expressed therein in terms of the metric system; and the tables may lawfully be used for computing, determining, and expressing in customary weights and measures the weights and measures of the metric system."

A meter is equal to 39.37 English inches.

A cubic meter is equal to 1.308 cubic English yards, or 35.316 cubic English feet.

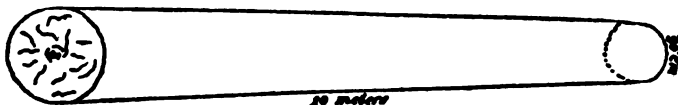
A liter is equal to 1.0567 liquid quarts.

A kilogram is equal to 2.20462 pounds, avoirdupois.

A quintal is equal to 220.46212 pounds, avoirdupois.

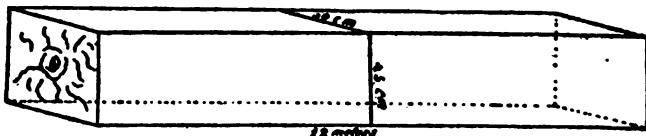
The volume of all timber in accordance with the provisions of section twelve of The Forest Act will be determined as follows:

Round timber.—Multiply the area of the smaller end by the length of the log.



Example: Length, 10 meters; circumference of smaller end, 90 centimeters or .90 meters. $.90 \times .90 \times .08 \times 10 = .648$ cubic meters.

Square timber.—Multiply the average cross section by the length, to which twenty-five per centum shall be added for loss in squaring.



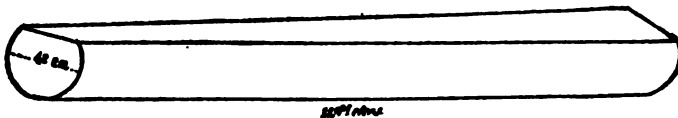
Example: Width of average cross section, 50 centimeters; thickness of average cross section, 45 centimeters; length, 12 meters. $.50 \times .45 \times 12 = 2.7$ cubic meters. 25 per cent of 2.7 = .675. $2.7 + .675 = 3.375$ cubic meters.

The volume of approximately octagonal logs (four sides being hewn and the other four unhewn) will be ascertained by multiplying eight-tenths of the square of the average diameter connecting the two pairs of opposite unhewn sides of the small end by the length.



Example: Average diameter between opposite unhewn sides of smaller end, 51 centimeters; length, 14 meters. $.51 \times .51 \times .8 \times 14 = 2.918$ cubic meters.

Logs having one hewn side, multiply eight-tenths of the square of the diameter by the length.



Example: Diameter, 42 centimeters; length, 11.4 meters. $.42 \times .42 \times .8 \times 11.4 = 1.608$ cubic meters.

The volume of all sawn timber will be determined, as provided in paragraph eight of section twelve of The Forest Act, by multiplying the average cross section by the length, to which fifteen per centum shall be added for loss in sawing.

In the measurement of a log having an eyehole or a ropehole in one end, the length shall be the distance from such hole to the more distant end of the log; provided, that if such hole be more than thirty centimeters from the nearer end of the log thirty centimeters only shall be deducted from the full length of the log in estimating the length for the purpose of determining its cubic contents.

No charge will be imposed for making out applications for licenses, nor for the certification or signature of the president of a town or settlement, or other person who forwards applications for licenses.

Native tree species.

Scientific name.	Common name.	Group.
<i>Azalia bijuga</i>	Ipil.....	First.
<i>Azalia rhomboides</i>	Tindalo.....	First.
<i>Alstonia macrophylla</i>	Batino.....	Third.
<i>Alstonia scholaris</i>	Dita.....	Third.
<i>Anisoptera thurifera</i>	Lauan.....	Fourth.
<i>Anisoptera vidaliana</i>	Mayapis.....	Third.
<i>Artocarpus cumingiana</i>	Anubing.....	Third.
<i>Bauhinia</i> sp.....	Bonga.....	Fourth.
<i>Buchanania florida</i>	Anam or Balinhasay.....	Fourth.
<i>Calophyllum inophyllum</i>	Palo Maria.....	Second.
<i>Canarium</i> sp.....	Bulao.....	Fourth.
<i>Canarium</i> sp.....	Pagsainguin.....	Fourth.
<i>Casuarina equisetifolia</i>	Agobo.....	Third.
<i>Oedrela toona</i>	Calantas.....	Second.
<i>Cynometra</i> sp.....	Batete.....	Fourth.
<i>Dillenia philippinensis</i>	Catmon.....	Third.
<i>Diospyros discolor</i>	Oamagon.....	First.
<i>Diospyros pilosanthera</i>	Bolongeta.....	Second.
<i>Dipterocarpus grandiflorus</i>	Apitong.....	Third.
<i>Dipterocarpus polyspermus</i>	Tangula.....	Third.
<i>Dipterocarpus vernicifluus</i>	Panao.....	Third.
<i>Dipterocarpus</i> sp.....	Banuyo.....	Second.
<i>Euphoria cinerea</i>	Alupag.....	Second.
<i>Gymnosporia ambigua</i>	Tamayuan.....	Third.
<i>Heritiera littoralis</i>	Dungon-late.....	Third.
<i>Homalium luzonense</i>	Aranga.....	Second.
<i>Hopsea plagata</i>	Yacal.....	First.
<i>Illipe betis</i>	Betis.....	First.
<i>Itesadaphne</i> sp.....	Malabonga.....	Fourth.
<i>Jambosa</i> sp.....	Macassan.....	Second.
<i>Koordersiodendron pinnatum</i>	Amuguis.....	Third.
<i>Lagerstroemia batitinan</i>	Batitinan.....	Second.
<i>Lagerstroemia speciosa</i>	Banaba.....	Second.
<i>Litsea perrottetii</i>	Baticulin.....	First.
<i>Livistonia merrillii</i>	Anabao.....	Fourth.
<i>Maba buxifolia</i>	Ebony.....	First.
<i>Mimusops elengi</i>	Bansalaguin.....	Second.
<i>Myristica</i> sp. ?.....	Malacados.....	Second.
<i>Palaquium tenuipetiolatum</i>	Manikie.....	Fourth.
<i>Palaquium</i> sp.....	Malacmalac.....	Third.
<i>Parkia roxburghii</i>	Cupang.....	Third.
<i>Pithecolobium acle</i>	Acle.....	First.
<i>Polyscias</i> sp.....	Malapapaya.....	Third.
<i>Pterocarpus indicus</i>	Narra.....	First.
<i>Pterospermum diversifolium</i>	Bayoc.....	Fourth.
<i>Rhizophora mucronata</i>	Bacao.....	Fourth.
<i>Sandoricum indicum</i>	Santol.....	Third.
<i>Sandoricum vidalii</i>	Malasantol.....	Third.
<i>Scelopora</i> ?.....	Bitanhol.....	Third.
<i>Shorea guiso</i>	Guijo.....	Second.
<i>Shorea malaanonan</i>	Malaanonang.....	Fourth.
<i>Shorea</i> sp.....	Mangasinoro.....	Fourth.
<i>Shorea</i> sp.....	Palosapis.....	Third.
<i>Sindora wallichiana</i>	Supa.....	Second.
<i>Sonneratia pagatpat</i>	Pagatpat.....	Fourth.
<i>Sterculia</i> sp.....	Nato.....	Third.
<i>Sterculia</i> sp.....	Tucan-calao.....	Second.
<i>Tarrietia sylvatica</i>	Dungon.....	Second.
<i>Tectona grandis</i>	Teak.....	Second.
<i>Terminalia calamansanai</i>	Calamansanay.....	Second.
<i>Terminalia catappa</i>	Dalins.....	Third.
<i>Terminalia edulis</i>	Calumpit.....	Third.
<i>Terminalia nitens</i>	Sacat.....	Third.
<i>Vatica mangachapoi</i>	Mangachapuy.....	Second.
<i>Vitex littoralis</i>	Molave.....	First.
<i>Wrightia ovata</i>	Laneta.....	First.
<i>Xanthostemon verdugonianus</i>	Mancono.....	First.
<i>Zizyphus zonulatus</i>	Balacat.....	Fourth.
(?).....	Apuit.....	Fourth.
(?).....	Malabalac.....	Fourth.

List of important Philippine woods arranged in the order of quantity received in the market for the fiscal years 1900-1901, 1901-2, 1902-3.

No.	Tree species.	Relative order, fiscal year—			Total amount cut, three years.
		1900-1.	1901-2.	1902-3.	
					<i>Cubic feet.</i>
1	Lauan.....	1	1	1	1,461,788
2	Apitong.....	4	2	2	963,469
3	Guijo.....	2	4	3	609,715
4	Molave.....	10	3	4	555,276
5	Yacal.....	15	7	5	307,798
6	Narra.....	13	5	6	280,773
7	Tangulle.....	20	6	7	256,166
8	Sacat.....	12	11	9	177,837
9	Ipil.....	26	12	8	176,580
10	Dungon.....	5	9	11	175,223
11	Malasantol.....	8	14	12	168,436
12	Supa.....	7	8	15	167,796
13	Balacat.....	8	13	14	133,697
14	Macaasin.....	6	25	10	133,621
15	Oalantas.....	11	15	16	117,721
16	Tindalo.....	22	19	13	109,768
17	Balinhasay.....	21	23	21	92,861
18	Malaanonang.....	35	16	18	91,632
19	Amuguis.....	17	32	17	88,981
20	Malabonga.....	19	18	26	85,635
21	Mangachapuy.....	24	20	24	81,929
22	Acle.....	34	24	20	82,062
23	Bacao.....	30	10	37	80,903
24	Oalumpit.....	23	34	19	78,821
25	Betis.....	33	21	22	76,766
26	Palosapis.....	25	17	28	75,169
27	Bansalaguin.....	14	35	25	74,842
28	Dalinsi.....	18	37	29	70,478
29	Nato.....	27	22	31	67,459
30	Malabulac.....	16	26	35	66,307
31	Panao.....	9	36	32	64,726
32	Palo Maria.....	36	29	23	62,962
33	Cupang.....	28	30	30	56,557
34	Banaba.....	37	33	27	50,425
35	Batitinan.....	32	23	34	47,804
36	Aranga.....	31	31	36	43,193
37	Banuyo.....	29	37	33	39,413

EXTRACTS FROM REPORTS ON FORESTRY AND LUMBER

[Extract from]

IMPORTANT PHILIPPINE WOODS

By Capt. G. P. AHERN, 1901.

CHAPTER II.

State Forests.

From various sources of information I am led to believe that the public forest lands comprise from one-fourth to possibly one-half of the area of the Philippine Islands, viz: from 20,000,000 to 40,000,000 acres. There are fully 5,000,000 acres of virgin forest owned by the State in the islands of Mindoro and Paragua. The island of Mindanao, with an area of more than 20,000,000 acres, is almost entirely covered with timber, there being but a small percentage of cultivated land. In the province of Cagayan, on the island of Luzon, there are more than 2,000,000 acres of forest. In the places just mentioned the cuttings up to the present date have been very small. In many other provinces in the island of Luzon, especially in the country close to Manila, much timber has been cut; and to fill large contracts the lumbermen are obliged to go quite a distance from this city in order to find a suitable tract. In a recent visit to the southern islands of this group, I was impressed with the amount of timber standing on the smaller islands; frequently the topography was such that it could be exploited with facility. I saw tracts of virgin forest where more than 10,000 cubic feet of magnificent timber per acre was standing: trees 150 feet in height, with trunks clear of branches for 80 feet. There are many millions of cubic feet of timber in these forests that should be cut in order to properly thin out the dense growth: for instance, where there are three or four trees growing on a space required by one, that one so freed would put on more good wood each year than the four together. Forestry is largely a question of light and shade; it is comparatively easy to learn the most desirable tree species for a certain locality, but the question whether 300 or 3,000 trees should remain on one acre is where the real value of the scientific forester is shown.

There are 396 tree species mentioned in the present forestry regulations. We know of 50 more growing in these islands, and from time to time we learn of still other species. It is safe to state that the number of native tree species found will be nearer 500 than 450, a great majority of these undoubtedly being hard woods. The edges of the great forests have been scarcely cut away and 50 valuable hard woods are given to the world, the full value of which species has not been demonstrated as yet. Six hundred and sixty-five native tree species now listed.

There are a great variety of valuable gum, rubber and gutta-percha trees, but the trade has been ruined by the Chinese in their efforts at adulteration and other fraudulent practices.

We have a list of 17 dye woods, the revenue from which, if properly exploited, should pay the cost of the forestry service.

A book has been written by Tavera on the medicinal qualities of the native plants, many trees being mentioned as possessing valuable qualities.

The ylang-ylang tree abounds here, its blossoms producing an oil which is the base of many renowned perfumes. Quite a revenue is gained by owners of these trees.

The west slope of the island of Romblon is a mass of cocoanut palms from the water's edge to the mountain top, every tree bringing in a yearly revenue

of from \$1 to \$2, and, when it is realized that several hundred such trees may be grown on an acre, one is struck with the wisdom of that former commander at Romblon who insisted upon such extensive planting of this species. In all parts of the southern islands these trees seem to grow without any effort or care.

Southern Paragua and Mindanao are celebrated for the great variety of gum, rubber, and gutta-percha trees grown there, but these forests have never been properly exploited, and afford a very attractive field for the investigator.

The following commercial uses of the above-mentioned tree species over such an extensive area give some idea of the great forest wealth of the Philippine Islands. Other uses will undoubtedly be discovered as investigation continues.

These forests produce: Timber and firewood; resin, gums and gutta-percha; textiles from seed, bark and trunk fibers; oils, including perfume essence, etc.; dyes; bark for tanning; sugar and fermented beverages; medicines; fruit and other food.

It will be the aim of this bureau to collect all data of interest connected with our forests. Specimens of woods will be added to those now on hand, and their uses and beauty shown as far as practicable. Investigators will be assisted and encouraged by this bureau to explore and report upon different features of the forest wealth of the islands.

Means of Communication.

There are no forest roads or river driveways in the islands that are worth mentioning. It will be impossible to exploit these forests until roads are constructed, rivers improved and harbors provided. The methods at present are exceedingly slow and expensive. The tree is felled far from any road, is hauled out very slowly by one or more carabaos, many tracts being left untouched, due to the difficulty of the haul and the lack of roads. The natives are not skilled lumbermen, and, while paid but a small wage, are by no means cheap labor when we consider the cost of felling and hauling a cubic foot of timber to the shipping point.

The most interesting statistics from foreign forestry reports are those published in Germany, showing the increase in the value of forest lands as the character of the roads improves. Good stone roads have made the German forest lands worth to-day, on an average, \$181 (gold) per acre, and these same lands with standing timber less in quantity and quality than we find at present on many large areas in these islands. There will be some difficulty in the construction of roads in such places as Cagayan, Mindoro and Paragua, but these difficulties can be overcome. Stone is plentiful and available, but labor is scarce, and such as we have is poor and uncertain. This latter will be the one great difficulty. When the labor problem is solved, engineers and money will build roads that will make the Philippine forests yield a revenue that is undreamed of to-day by the residents of these islands.

Lumbermen contemplating extensive operations, after solving the labor problem, must next consider the roads and driveways. The main roads should be built by the State with a view to the gradual betterment of the tributary forests. For several years the efforts of the forestry service should be directed to a judicious thinning of the dense jungles where an axe has never been heard, many varieties of undesirable tree species should be cut away and the dense growth thinned out. The State and lumbermen should work together; after the first roads are started the lumbermen can figure on the possibilities of the first forests so tapped. There are no pure forests of any one tree species; dozens of varieties grow in each forest, but there are rarely more than three or four trees of one variety found grouped together, so that any lumbermen looking for a shipload of any one species would find it impossible to cut that and no other, but would be obliged to procure the same by purchase from men operating in different sections. Lumbermen must be willing to take dozens of varieties of tree species.

Markets.

There is a great demand in Manila, in fact all through the Orient, for construction timber; the demand will continue, as many important public works are in contemplation in the Philippines, many private enterprises will make demands, thousands of houses must be built, and when the present condition of these islands and the vast amount of work to be done are considered, it would

be difficult to foretell when the present high prices for timber will materially lessen. There are very few lumber companies here properly equipped to handle large logs; it will take companies contemplating such work many months to establish themselves, to secure labor and transportation to deliver their first cargo; and if such companies are not prepared to furnish master mechanics, expert gang bosses, in fact all the skilled labor required, with a full stock of the best supply material, it would be hazardous to attempt to move the large logs which must be cut and brought to market if these forest tracts are exploited properly. It has been the custom by loggers in many parts of these islands to leave the large trees and cut smaller trees so that now in many of the Philippine forests we find only very large trees and very small ones.

Labor.

Much has been said against the native as a laborer, but as a matter of fact the Filipino and Moro have worked well, and are working well. The native must be treated considerably, he should receive his full wage and not be kept in debt for years, receiving in lieu of pay a few yards of calico and a few pounds of rice at fancy prices. We read much of the heavy losses sustained by advancing wages to native laborers; as a matter of fact the first advance of money is often a charge that should be met by the employer, and if not such a legitimate charge, is soon made up by profits on the necessities of life sold to the native. In Mindanao, where an American officer has a number of Moros employed, the first wages were paid daily, then by the week. The astonishment of these natives at receiving real money was amusing to the officer; in a very few weeks many of these same workmen, having satisfied their first needs, requested permission and were allowed to deposit their pay with the officer. Such a spirit has been encouraged; it means much to such a community. These people no longer fear the tax gatherer, they can accumulate, become property holders, and then, staunch friends of law and order.

The Chinese coolies work well in the timber, but at present many are not willing to go far from the towns, being afraid of the ladrones and insurrectos. The native has been cutting and hauling timber to the railroad and water's edge recently for about 25 to 40 cents, Mexican, per cubic foot—that is the price paid to the headman of the native gang. The logs are hauled out by carabaos, usually on mud sleds; recently sixteen carabaos were hitched to one very heavy log which they hauled into a station on the railroad. The carabao is not very strong and succumbs quickly if worked hard. He is useful in the rice field and in swampy ground, but will not meet the demands of the American lumberman. Good roads, mules, portable railways, donkey engines, etc., with intelligent supervision, will go far toward making this vast timber wealth available.

The American lumberman can do it, but not until he has carefully investigated the conditions and is prepared to meet them. There are obstacles here which will paralyze the efforts of companies not fully prepared. This investigation and preparation will take time and should be made by practical men. A good price is paid at Hongkong for timber from the Philippines and Borneo and every stick of timber is eagerly bought up as soon as a vessel arrives. Although the prices in Manila are very high, not much Borneo timber is received here.

Prices.

High prices have prevailed in Manila ever since the American occupation, due to the scarcity of supply and to the great demand for timber by quartermasters, engineers, and Signal Corps, as well as by private parties.

As a rule timber is bought and sold by the cubic foot, occasionally the metric system is used; the loggers very often sell by the vara (33 English inches), that is, a log squaring 12 inches will sell at so much a vara in length, one 10 by 12 or 12 by 14 inches at so much a vara, etc.

In 1875 the prices for timber in Manila ranged from 25 cents per cubic foot for bancal, lanutan, paltan and many other species, to 50 cents and less for molave, narra, ipil, dungon, mangachupuy, acle, tindalo, yacal, baticulin, calantas and others. In 1897 the price in Manila for woods of the first and superior groups ranged from \$1 to \$1.50 per cubic foot; the second group, 65 cents to \$1; third group, 50 to 75 cents; fourth group, 30 to 50 cents.

Since American occupation the prices for logs have been as follows: Superior group, \$1.50 to \$3 per cubic foot; first and second groups, \$1 to \$1.50 per cubic foot; third group, 60 cents to \$1.50 per cubic foot.

Very few woods can be bought in this market for less than \$1 per cubic foot; the retail lumberman sells small lots of some species of the superior group as high as \$4.50 per cubic foot.

Contracts have just been let for piles (first group timber), 30 to 50 feet in length, at \$11.50 to \$12 per pile. Telegraph poles cost \$1.50 to \$2 a piece, delivered at the railroad. All prices mentioned are in Mexican money.

At present, freight rates are very high and will probably remain so for a long time, as the increase of trade which will follow cessation of hostilities will be very rapid, making the question of transportation a very difficult one.

CHAPTER III.

List of Woods Described.

Acle.	Batittinan.	Ebony.	Molave.
Camphor.	Bayuco.	Guijo.	Narra.
Alintatao.	Betis.	Haras.	Palo-Maria.
Anagap.	Bitoc.	Ipil.	Panao-balao.
Anubing.	Calantas.	Lanete.	Supa.
Apitong.	Calamansanay.	Lanutan.	Tindalo.
Aranga.	Calumpit.	Lauan.	Tamauyan.
Amuguis.	Camagon.	Macaasin.	Tanguile.
Banaba.	Camuning.	Malaruhat.	Teca.
Bancal.	Dinglas.	Malatapay.	Urung.
Bansalaguin.	Ditaa.	Mancono.	Yacal.
Baticulin.	Dungon.	Mangachapuy.	
Batino.	Dungon-Late.	Mangasrique.	

* * * * *

CHAPTER IV.

The Anay, or White Ant.

"The white ant (termes), known here as "anay," is by far the most formidable insect in its destructive powers. It is also common in China. Here it eats through most woods (there are some rare exceptions, such as molave, ipil, yacal, etc.) and indeed some persons assert, although I am unable to confirm it, that even the surface of iron is affected by these insects if left long enough where they are. If white ants earnestly take possession of the woodwork of a building not constructed of the finest timber, it is a hopeless case. I have seen deal-wood packing cases eaten away so far that they could not be lifted without falling to pieces.

"Merchants' warehouses have had to be pulled down and rebuilt owing to the depredations of this insect, as even if the building itself were not in danger, no one would care to risk the storage of goods inside. The destruction caused by anay is possibly exaggerated, but there is no doubt that many traders have lost considerable sums through having to realize, at any price, wares into which this insect had penetrated."—*Foreman, p. 390.*

The following woods are not subject to attack by anay: Dinglas, ipil, molave and yacal.

Tindalo is attacked by anay when there is no other wood in the vicinity.

Baticulin is attacked by anay but is not damaged or destroyed, except such parts as are buried underground.

One hundred and twenty varieties of native woods and also woods from Borneo and America are being subjected to tests as to resistance to the white ant. These tests began December 1, 1900. A bulletin showing results will be issued this year.

TEST WITH THE WHITE ANT.

Mr. D. N. McChesney, master mechanic at the depot quartermaster shops in Manila, found last February that his trunk (made of an American spruce) had been invaded by white ants, and was almost entirely destroyed; the clothes contained in the trunk were also eaten. He placed the trunk on the ground and near it pieces of the following woods:

Variety.	Result of thirty days' contact with ants.
AMERICAN WOODS.	
Oregon pine.....	Entered and eaten; a mere matter of time for complete destruction.
Bull pine.....	Eaten more readily than Oregon pine.
Spruce.....	Do.
Hemlock.....	Not touched.
California redwood.....	Ants tried, but discontinued after a slight effort.
California white cedar.....	Do.
NATIVE WOODS.	
Molave.....	Ate a little of it, deepest hole about one-fourth of an inch.
Narra.....	Ate a little of it, deepest hole about one-half of an inch.
Painted wood.....	Ants worked under paint and ate the wood readily.

CHAPTER V.

Strength and weight of woods.

List of hard woods arranged in order of their tensile and transverse strength.

[Foreman, p. 372.]

Tensile strain.	Transverse strain.	Tensile strain.	Transverse strain.
1. Dungon.....	Molave.	8. Acle.....	Banaba.
2. Yacal.....	Camagon.	9. Narra.....	Yacal.
3. Ipil.....	Ipil.	10. Tindalo.....	Mangachapuy.
4. Mangachapuy.....	Acle.	11. Molave.....	Lauan.
5. Guljo.....	Dungon.	12. Lauan.....	Guljo.
6. Banaba.....	Tindalo.	13. Cedar.....	Cedar.
7. Camagon.....	Narra.	14. Lanete.....	Lanete.

List of woods, arranged in order of their elasticity, resistance and specific gravity.

[Sebastian Vidal, p. 178.]

Elasticity.	Resistance.	Specific gravity.
Calantas.	Pagatpat.	Ebano.
Sulipa.	Bansalagin.	Camagon.
Antipolo.	Yacal.	Yacal.
Lanete.	Culing-manoc.	Pagatpat.
Anagap.	Manilenic.	Anusep.
Baticulin.	Ipil.	Manilenic.
Apiton.	Molave.	Dungon.
Amuguis.	Narra.	Molave.
Macasin.	Cubi.	Toca.
Bancal.	Guljo.	Tindalo.
Anublong.	Acle.	Bolongita.
Marang.	Ebano.	Camayuan.
Calumpnan.	Camagon.	Ipil.
Malaruhat.	Tindalo.	Pasec.
Calumpit.	Calamansanay.	Lanutan.
Banaba.	Calumpnan.	Banaba.
Anusep malatalan.	Anusep.	Cubi.
Malatalan.	Pino.	Culing-manoc.
Manilenic.	Palonapuy.	Mangachapuy.
Mayapis.	Panguisan.	Calumpang.
Acle.	Camayuan.	Panguisan.
Calamansanay.	Dungon.	Betis.
Narra.	Bolongita.	Acle.
Balao or Pnao.	Mangachapuy.	Guljo.
Molave.	Betis.	Uncasin.
Guljo.	Lanutan.	Bansalagin.
Palonapuy.	Antipolo.	Calumpit.
Tindalo.	Bancal.	Malatan.
Cubi.	Balao or pnao.	Calamansanay.
Yacal.	Malatlan.	Malaruhat.
Camaynana.	Nato.	Narra.
Santol.	Banaba.	Apiton.
Bolongita.	Tangle.	Pino.

List of woods, arranged in order of their elasticity, resistance and specific gravity—Continued.

Elasticity.	Resistance.	Specific gravity.
Dungon. Mangachapuy. Nato. Teca. Malacadios. Panguisan. Pino. Betis. Ipil. Ebano. Camagon. Bansalagul. Ouling-manoc. Lanutan. Pagatpat.	Palo-maria. Macasin. Malaruhat. Pasac. Mayapis. Lanete. Santol. Anublong. Malacadios. Anagup. Calumpit. Apiton. Baticulin. Calantas. Marang. Sulpa.	Tangile. Antipolo. Anublong. Malacadios. Nato. Palo-maria. Palonapuy. Calantas. Amugius. Bancal. Mayapis. Baticulin. Lanete. Anagap. Santol. Marang. Sulpa. Balao.

Woods that last well in water.

Apiton.	Ipil.
Banaba.	Acle.
Bancal.	Lauan (only for bancas).
Batitinan.	Mangachapuy.
Betis.	Molave.
Calantas.	Panao-Balao.
Dinglas (used largely in naval construction.)	Tanguile (cascos and bancas).
Dungon (especially durable in sea water.)	Teak.
	Tindalo.
	Urung.

Woods that last well in the ground, with concrete next to wood.

Molave.	Antipolo.	Pasac.
Dungon.	Banuyo.	Anubing.
Ipil.	Guisihan.	Malaputat.

"A visit to the Philippine Islands."—*Bouring, 1878.*
[Extract taken by him from a publication in 1893 by Ool. Valdes.]

Names and uses.	Resistance.			Maximum elasticity to be allowed in house construction.	Weight corresponding to this elasticity.	Force of elasticity of square meter.	Resistance to bending (coefficient of fracture).	
	Weight of cubic decimeter.	Per cubic centimeter under pressure.	Tension or force of cohesion.				Absolute strength.	Applicable force.
	Kilo.	With the grain vertical.	With the grain horizontal.		Kilo.		Kilo.	Kilo.
Ale: Plentiful in the islands; used for edifices and cascos.	1.12	408	340	11.1,000=0.001	40.0	49.130	140.0	14.00
Alintao: There are various kinds, and is used for making furniture in Luzon and Visayas.	.91	598	300	11.1,080= .0008	72.8	78.600	150.0	16.00
Alupag, or Alopal: Is used for supports and is plentiful.	.92	666	220	11.1,448= .0007	124.2	179.280	178.2	17.82
Amogues, or Amogis: Is very much subject to attack by ants; is used for planks and boards for flooring.	.98	338	130	11.1,000= .001	57.2	86.362	165.5	16.55
Animaba, or Anisapia: Is used in building houses and boats; prized for its lightness and duration.	.59	340	146	11.1,385= .00075	49.3	65.500	146.37	14.64
Anonang: The leaves are covered with worms; the wood is used for drums and musical instruments.	.46	340	120	11.1,042= .0005	74.5	424.700	64.0	6.40
Anipolo: For canoes, floors, and machines; it gives a gum which is used for birdlime.	.41	236	70	11.1,380= .00072	56.4	78.608	115.0	11.50
Balbago: Twine and paper are made from the bark, and powder from the charcoal.	.46	616	260	11.924= .00108	118.0	108.000	165.0	16.50
Balele: The bruised roots are used to cure wounds.	.40	498	176	11.2,008= .00049	134.5	270.000	99.1	8.91
Baleulin: White wood, for moulding and sculpture; very durable; abundant.	.42	186	100	11.1,518= .00055	21.5	89.300	114.1	11.45
Baraba: Resists well the action of the climate.	.65	348	126	11.1,212= .0008	90.4	112.300	166.0	16.60
Bancal: Strong and durable; it is used for furniture, flooring, boats, and barrels.	9.58	220	66	11.148= .00071	47.0	65.500	763.7	7.64
Bitec: Resists well heavy pressure.	.71	338	100	11.700= .00148	101.0	68.250	216.4	21.64
Bolongruta: Strong for building purposes; plentiful.	.90	360	120	11.917= .00109	85.8	78.000	153.0	15.30
Calamansay: Used for flooring.	.86	533	130	11.886= .00113	89.2	78.000	165.0	16.50
Calante: It is found in all parts of the Philippines and is used for canoes and fine boxes.	.40	470	60	11.1,515= .00068	51.7	78.600	108.2	10.82
Calumpit: For building; very strong wood.	.60-.80	340	90	11.87= .00115	90.5	78.000	1,272.8	12.73
Camaragon: With beautiful grain and spots; polishes well and is used for fine furniture.	.92	558	340	11.952= .00105	75.2	71.472	172.0	17.20
Camarayan: It is used for house building.	.94	434	340	11.383= .00075	49.3	65.500	166.0	16.60
Dingron: Fine wood for edifices; it is very plentiful.	1.02	435	200	11.928= .00108	85.8	80.468	140.0	14.00
Ebano: Admits of a fine polish and can be beautifully worked.	1.91	688	470	11.8= .00106	112.2	97.400	114.0	11.40
Gujo: Is plentiful and very highly prized; is used for keels of vessels and carriage wheels.	.76	370	140	11.835= .0012	72.0	60.000	190.1	19.00
Manete: Elastic and appropriate for furniture.	.55	336	120	11.685= .00144	46.2	31.443	165.0	16.50
Saun: Gives a resin used for incense; in former times used for vessels; plentiful.	.43	225	90	11.1,031= .00097	90.4	71.742	76.4	7.64

"A visit to the Philippine Islands."—*Bourting, 1876*—Continued.

Names and uses.	Weight of cubic decimeter.	Resistance.			Maximum elasticity to be allowed in house construction.	Weight corresponding to this elasticity.	Force of elasticity of square centimeter.	Resistance to bending (coefficient of fracture).	
		Per cubic centimeter under pressure.	With the grain vertical.	With the grain horizontal.				Absolute strength.	Applicable cable force.
	Kilo.	Kilo.	Kilo.	Kilo.		Kilo.		Kilo.	Kilo.
Malacatan; Very little used.	.63	146	60	306	41. 1,724=.00068	30.6	52,400	140.0	14.00
Malacutud; A strong wood; used for house building.	.645	400	160	965	41. 788=.00126	96.5	78,600	166.4	16.54
Malacutundao; Makes strong turlock timbers in framing ships.	.78	380	118	1,108	41. 714=.0014	110.8	78,600	101.82	10.18
Malatunsi; Elastic and flexible; for naval construction.	.70	300	60	498	41. 500=.002	49.8	25,230	191.0	19.10
Malatunsi; Solid texture; uses not mentioned.	.70	340	76	870	41. 1,300=.00077	87.0	92,800	146.4	14.64
Malatunsi; For furniture and edifices; it resembles ebony.	.78	500	200	740	41. 500=.002	74.0	112,800	64.0	6.40
Malabagat; For edifices, especially for pieces used lengthwise.	.59	380	120	1,480	41. 770=.0013	148.0	90,000	16.4	1.64
Manga; Variety of the manga of Cuba; on account of value of fruit wood little used.	.58	380	106	910	41. 989=.001	91.0	82,887	165.0	16.50
Mangachapay or gilson dilao; For vessels and flooring of buildings.	.58	498	188	372	41. 1,700=.006	37.2	78,600	254.6	25.460
Molave; Called "Queen of Woods" by natives; applied to all uses; resists action of climate, lime, and insects.	.95-1.02	600	230	1,257	41. 685=.0016	125.5	52,400	127.3	12.730
Narra, or naga, or asang; For edifices, furniture, doors, and windows.	.66	500	200	683	41. 833=.0012	68.3	87,850	134.0	13.400
Palma-brava or anajao; Strong and durable, especially in water; used for stakes.	.66	400	126	950	41. 986=.00109	96.0	78,600	158.0	15.800
Palosapis; For masts, crosspieces, etc., of vessels.	1.085	530	400	892	41. 894=.00113	89.2	108,000	89.0	8.900
Panau, or balao, or malapajo; For canoes and bancos.	.50	440	146	870	41. 1,243=.0008	87.0	90,000	101.8	10.180
Panau; A strong wood; used for canoes and bancos.	.69	338	149	800	41. 1,125=.0009	80.0	108,000	134.0	13.400
Pencapencan; An odorous resin used by natives for illuminating purposes; used also for varnish.	.46	378	108	972	41. 1,111=.0009	97.2	270,000	158.0	15.800
Pototan or bacao; Used generally for shoes and buoys.	.69	420	146	1,780	41. 1,517=.00066	178.0	78,600	121.0	12.100
Sampaloc or tamarindo; For tools and other purposes and for action of water.	.62	320	90	846	41. 824=.00107	84.6	108,000	158.0	15.800
Santo; Used for posts and pillars; not very plentiful.	.62	320	90	846	41. 824=.00107	84.6	108,000	158.0	15.800
Tanguil; For edifices.	.67	300	100	688	41. 1,823=.0007	81.0	71,463	114.56	11.456
Tangan; For window frames, joists, etc.	.67	330	60	658	41. 1,813=.00066	65.8	65,500	114.56	11.456
Tindalo; For furniture; emits an agreeable smell.	.59	450	106	470	41. 766=.00135	47.0	49,130	166.6	16.660
Yacal; For shipbuilding, rafters, and joists.	1.106	450	200	1,174	41. 1,042=.00066	117.4	89,200	191.0	19.100
Yapi; Used generally for house building; is plentiful in Luzon.	1.085	434	809	568	41. 883=.0012	56.8	39,800	158.0	15.800

	Traction.		Compression.		Flexion.		Torsion.		Resistance to cutting.	
	Limit of elasticity.	Rupture.	Limit of elasticity.	Absolute resistance.	Limit of elasticity.	Resistance.	Limit of elasticity.	Resistance.	Perpendicular to fiber.	Parallel to fiber.
Narra (red).....	245	313	217	313	295	500	38	82	320	75
Pagatpat.....	200	688	245	450	183	476	36	58	298	38
Pasac.....	171	513	200	374	138	303	32	52	208	32
Supa.....	288	321	343	373	256	532	36	78	229	72
Solipa.....	125	288	188	248	282	329	33	51	172	44
Teca.....	354	688	243	368	288	590	43	96	392	88
Tindalo, or Batalayon.....	324	652	238	351	272	587	43	96	350	78
Tangle.....	285	348	313	317	250	584	45	73	300	75
Yacal.....	365	672	245	372	323	663	52	92	371	76
Ypil.....	193	638	241	357	128	382	34	58	296	36
Yamagua.....	100	413	198	283	71	200	23	51	201	31

	Cohesion.		Pressure.		Flexion.		Torsion.		Resistance to cutting.	
	Limit of elasticity.	Rupture.	Limit of elasticity.	Absolute resistance.	Limit of elasticity.	Resistance.	Limit of elasticity.	Resistance.	Perpendicular to fiber.	Parallel to fiber.
Acle.....	183	390	218	311	216	482	34	62	286	71
Antipolo.....	180	377	216	313	219	478	32	60	281	68
Amugula.....	172	353	211	308	212	450	32	57	270	62
Apiton.....	166	335	208	300	207	444	30	52	261	60
Anuvion.....	180	337	228	344	232	481	35	54	280	65
Bansalagui.....	310	552	235	327	312	542	44	85	370	73
Bancal.....	280	333	218	245	213	418	32	54	198	78
Betis, or Azaola.....	389	637	253	385	338	632	52	101	398	73
Balao.....	230	301	210	284	275	443	34	78	180	72
Banaba (red).....	346	670	273	400	338	638	52	108	387	79
Camunin.....	357	637	275	392	343	637	48	97	386	77
Cedro, or Calantas.....	172	513	212	350	130	300	30	52	215	33
Camagon.....	363	700	247	385	327	691	49	97	382	77
Calamansanay.....	304	483	222	301	257	513	31	77	208	70
Dungon.....	327	394	377	398	192	603	67	82	334	79
Dinglas.....	343	395	383	415	187	690	69	83	400	88
Ebano mulato.....	315	696	380	397	215	685	69	83	403	92
Guijo.....	320	380	374	427	175	622	63	80	298	82
Laneta.....	253	240	111	233	175	412	28	71	238	57
Lanutan.....	320	388	345	352	187	613	90	81	385	87
Malarajat.....	287	315	371	312	152	527	59	78	346	77
Malatapay.....	318	402	395	408	203	682	71	81	390	89
Molave.....	282	318	223	343	225	568	60	79	341	77
Manicnic.....	322	690	397	398	667	690	77	86	410	90
Mangachapuy.....	281	312	300	337	153	598	65	82	312	79
Macasin.....	292	325	327	343	155	568	60	77	341	69
Mayapis.....	213	454	221	395	137	309	33	50	233	44

Other woods mentioned.

[Salvador Ceron, Inspector General de Montes, 1889-1893.]

Acacia of 3 points.
 Abeto.
 Aliso.
 Alerce of Alpes.
 Algarrobo.
 Abedul.
 Acebuche.
 Alcornoque.
 Acana.
 Alerce of Canada.
 Aiti or Iti.

Almez.
 Alamo (white).
 Brasil (red).
 Brasil sappan.
 Balsamo.
 Baria or ataje.
 Balonguita.
 Baldomero.
 Carpe.
 Cuvil.
 Caoba.

Cucuyo.
 Chicharron.
 Culling-manog.
 Cerezo.
 Castaño.
 Cuaba.
 Calmito.
 Carne de doncella.
 Cuero duro.
 Dagame.
 Enebro.

Other woods mentioned—Continued.

Encina.	Monte-Cristo.	Palma brava.
Ebano carbonero.	Moruro.	Palo apuy.
Fresno.	Maboa del Interior.	Quiebra hacha. *
Granadillo.	Manianita.	Quejigo.
Guayacan.	Nogal.	Roble comun.
Guairaje.	Nato.	Roble albar.
Guayabo.	Olmo.	Roble pedunculado.
Haya.	Palo mulato.	Roble melojo.
Jucaro black.	Palo diablo.	Raspa-lengua.
Jaimiqui.	Pinabete.	Sauce.
Jagwey.	Pinsapo.	Serbal.
Jigul de la ley.	Pino salgareño.	Sabucan.
Jiba.	Pino carrasco.	Sabicu.
Jaboncillo.	Pino silvestre.	Santol.
Leviza.	Pino de Escocia.	Sigua.
Mamey.	Pino pinonero.	Tamarindo or Sampaloc.
Majagua.	Pino de la Florida.	Tortuga.
Malarigat.	Pino de America.	Tilo.
Malabongo.	Pino negro.	Yana cuaba.
Malacadins.	Pino marítimo.	Yaiti.
Malatalisais.	Pino or palo pino.	Yana.
Mangle (red).	Pino de Canarias.	Yua.
Maboa de la Costa.	Palma real.	

CHAPTER VI.

Uses of woods.

WOODS MOST PREFERRED IN NAVAL AND ORDINARY CONSTRUCTION.

The woods most esteemed at present for export are the following:

In naval construction a wood should have, in addition to close and compact weight, a certain amount of elasticity and be easily worked, qualities which make the teak of Malabar so valuable.

Lloyd in his classification of woods has placed the molave, dungon, and betis in the highest class.

The following are preferred in China:

Futtock timbers (frames of vessels).—Molave and other similar woods. Futtock timbers should have a minimum length of 30 feet.

Stems, sternposts and stanchions.—Molave, dungon and analogous woods.

Beams and planks.—Mangachapuy, batitinan, banaba and others analogous and having close and compact pores and a certain elasticity and buoyancy.

Keels.—Betis and dungon.

Decks.—The Chinese prefer the North American pine. This affects very much the sale of malasinoro, lauan rojo and other similar woods. The pine from Puget Sound, Oregon, and other parts of the United States and also the peun of Singapore, which is our sambualan, is sold in Shanghai free of duty at .035 to .05 cents (Mex.) per square superficial foot, and 1 inch thick. At these prices it is impossible for us at present to compete in deck timbers.

In ordinary construction the woods generally used are bansalaguin, macasin, calumpit, guiji, pagatpat, malatumbaga, supa (sold under the name of ipil), ipil (known as black ipil), malasinoro (passed as mangachapuy), mangachapuy (passed in China as white molave), acle (very similar to the teak, jungle teak of Singapore and Borneo), maladungon, balaon and apiton rojo, these three being prized as piles, mulamgat, malauin aso (passed as molave), yacal (called there "gray molave"), bulobog (sold as apitong), sandano (passed as molave), bancalanag, duca, calamansanay and some others.

From the above it will be seen that exporters pass off woods of an inferior quality for those of a higher grade, thus discrediting the superior woods. Notwithstanding this the Chinese never buy wood by invoice and attach little importance to names. Their methods of buying are very crude, the principal factors of importance to them are, that the wood does not float, and that it is of a dark color, when as a matter of fact many of the Filipino woods of the first-class, when well seasoned, float; the question of color is of little or no importance. Their methods of buying is by inspection, cutting the wood with an axe and

examining it; the woods which they prefer are the molave, narra, bansalaguin (highly prized), yacal, dungon, supa, tindalo, betis, mangachapuy, camagon, acle and ipil. There are others which have little or no value in the Philippines, being subject to attacks by the anay, woods which should find a ready sale and be well appreciated in northern China and Japan, where this destroyer, *termis dives*, is unknown.—*Domingo Vidal*, p. 202.

List of the principal woods of the Philippines arranged according to uses.

[Sebastian Vidal, pp. 179-180.]

FOR CABINET MAKING.

For fine furniture.—Ebano, camagon, bolongita, tindalo, narra, malatapuy, alintatao, camuning.

For ordinary furniture.—Lanete, narra blanca, lanutan, malaruhut, antipolo.

FOR NAVAL CONSTRUCTION.

Keels, stern-posts.—Yacal, betis, dungon, ipil.

Futtock timbers, sterns, knees.—Molave.

Outside construction, beams.—Banaba.

Beams, masts.—Guijo.

Keelsons, sleepers.—Batittinan.

Waterways, decks.—Mangachapuy.

Superstructure, inside divisions.—Amuguis, of mariveles.

Futtock timbers, masts.—Palo-maria.

The frigate *Esperanza*, built at Cavite Arsenal in 1834, and which still has her woodwork in perfect condition, is testimony of the great superiority of the Philippine woods in ship building.

CONSTRUCTION OF CANOES (BANCAS).

Tangle, lanuan, malaanonang, balao, mayapis, and many others less used. Quick grower.

FOR HOUSE CONSTRUCTION.

Molave.—Pillars, joists and window and door and other frames.

Ipil.—Same uses.

Supa, balao.—Substitutes for ipil, but are inferior.

Dungon.—Pillars, sills, dormers, etc., especially used for pieces required to resist much pressure, and which do not need to be finely finished, for it is not easily worked.

Banaba.—It is employed in many different kinds of pieces. Moisture affects it very slightly.

Yacal.—Excellent for rafters and other pieces. Those of large dimensions are becoming scarce; nevertheless, there are some twelve meters long by 0.20 to 0.25 meters square.

Amuguis, bataculin, malatumbaga.—Generally sawed into planks and used for partitions, ceilings, etc.

Calantas.—For special line of boxes for superior class of cigars.

FOR ORDINARY BOXES.

Tangle, mayapis, malaanonang, and many others of many classes, easy to saw and very plentiful.

1. Curved pieces 15 to 20 meters long, 0.23 to 0.30 wide and 0.45 thick.

2. Of short duration; did not last ten years in the canoneras.—*S. Vidal*.

Many of the Philippine hard woods considered of no value here on account of the insects, climate, etc., would find favor in America where such enemies would not be encountered. Many such woods are strong, of fine grain, take a high polish and are excellent material for fine furniture.

Uses of various classes of timber.

Pillars or harigues.—Molave, ipil, and anobin; the latter must be thoroughly free of sap or white wood, which is attacked by white ants. Acle also is used for harigues.

Beams on the pillars to receive rafters.—Dungon and yacal, which are notable for resisting great transverse pressure, and attacks of white ants.

Joists, rafters, etc.—Yacal, banaba, batitinan, macasin, ipil and dungon; latter two kinds are rather heavy for roof work.

Flooring.—Banaba, guiño, mangachapuy, macasin, tindalo, supa and calamansanay.

Partitions.—Banaba, bancal, guiño, calantas, mangachapuy, etc.

Tabla din-din or outside planks of houses.—Molave, narra, acle.

Window frames.—Molave.

Doors.—Narra, cedar.

Ceiling.—(Cedar calantas) Baticulin, anagap, mangachapuy.

Rafters, joists, flooring.—Aranga.—*Laguimanoc, 10th December, 1888. H. G. Brown.*

CHAPTER VII.

Gutta-percha in Mindanao.

"The Father Missionaries of the Company of Jesus have just written the Father Professor of natural history in the Municipal Atheneum of Manila, giving an interesting account of the new industry of procuring gutta-percha in that island.

"Father Bofill under date of December 23, writes: 'During the past three months, the tirurayes (tamontaca), near Cotabato, have been actively engaged in extracting in the forests Fequet, a species of gum, from the fefedus tree. They fell the tree and make perpendicular cuts along the trunk, and collect in large leaves the juice which exudes.

"At first they sold this gum to the Chinamen at \$3 and \$4 a pico, but now they get \$30 for it; it is really worth \$70 in Europe.

"I advise you of this that you may know what a useful product this is, and the facility with which it can be extracted; it is a great pity that the trees are destroyed.

"Many people are engaged in this industry and they are now extracting the gum from the trees in the forests of Dulanganas. It is also said to exist in the island of Bongao.'

"Father Sancho adds in a letter from Zamboanga, dated December 26: 'It has just come to my knowledge that my parishioners of Santa Maria have discovered a new gum, so valuable as to be worth \$25 a pico. I will try to procure a good sample and send it to you.'

"The word gutta-percha is of Malay origin and signifies gutt, gum, percha, Sumatra; i. e., gum of Sumatra.

"It belongs to the sapotaceæ and to the genus *Isonandra*.

"Mr. Robert Wright in his 'Illustrations of Indian Botany,' says, in Volume II., XCVIII, Sapotaceæ: 'There are two species of *Isonandra*; one grows in the forests, the other in the foothills of the mountains. Gutta-percha is the most highly prized of all, among the products of the sapotaceæ.

"It is extracted from the *Isonandra percha*, Hooker.

"This genus originated from two plants in my collection; afterwards three more were discovered, all of India, the properties of which have not yet been investigated.

"The *Isonandra* of the Indias differs from that of the Filipinas in that the flowers of the Filipinas are hexamerous while those of India, tetramerous; in other respects these two species are so analogous as to appear to be species of the same genus; yet there is a difference in their properties as there is in their flowers."—*Revista Catolica de Filipinas, Wednesday, February 1, 1893.*

Gum elastic.

"Gum elastic is extracted from trees belonging to the family of the Urticaceæ principally the *Ficus elastica* and is so well known that there are many growing in the gardens of Manila. It is also extracted from the *Ficus radicans* and from two other species of *ficus* which grow in the forests of the Philippines; also from various trees of the genus *Artocarpus*.

"The Gutta-percha of the commerce of Manila comes from the trees of the family sapotaceæ of the genus *Sideroxylon*, *Dichopsis* and principally *Palatum*.

"The gutta-percha coming from Mindanao is sometimes adulterated, being mixed with the juice of the *Alstonia* and other trees which have a milky juice but which is not of the consistency of gutta-percha."—*R. Garcia*.

Tree species of the Sapotaceæ and Urticaceæ families found in the Philippine Islands.

- Lucuma mammosa* Gært., Chico mamey.
Sideroxylon attenuatum, A. DC.
Sideroxylon ferrugineum, Hook.
Sideroxylon parvifolium, F. Vill.
Sideroxylon Duclitan, Blanco, Duclitan.
Sideroxylon nitidum, Bl.
Sideroxylon Balitbitan, Blanco.
Achras Sapota, Linn., Chico.
Palaquium latifolium, Blanco, Palacpalac.
Palaquium olciferum, Blanco, Alacap.
Palaquium lusoniense, Vid., Bagalangit.
Palaquium lanceolatum, Blanco, Bagalangit.
Palaquium cuneatum, Vid.
Isonandra Gutta, Hook, Malaputat.
Chrysophyllum grandifolium, Steud.
Dichopsis polyantha, Wall.
Dichopsis cuneata, Bl.
Bassia butyracea, Roxb.
Azola Betis, Blanco, Betis.
Mimusops Elengi, L., Cabiquil.
Mimusops parvifolia, Br., Bansalaguin.
Mimusops Manilkara, G. Don.
Artocarpus incisa, L. f., Antipolo.
Artocarpus Rima, Blanco, Rima.
Artocarpus elastica, Reinw., Tugup.
Artocarpus Camansi, Blanco, Camangsi.
Artocarpus odoratissima, Blanco, Lolol.
Artocarpus polyphema, Pers., Marang.
Artocarpus integrifolia, Willd., Nangca.
Artocarpus Cumingiana, Trec., Cubi.
Artocarpus ovata, Blanco, Anubing.
Artocarpus nitida, Trec, Bayuco.
Ficus indica, Linn., Baliti.
Ficus clusoides, Miq., Balete.
Ficus benjamina, Linn., Baliti.
Ficus microcarpa, Linn. f., Bigaa.
Ficus parvifolia, Miq., Baliti.
Ficus concinna, Miq., Nonoc.
Ficus hæmatocarpa, Bl., Taglicot.
Ficus pungens, Reinw., Agos-os.
Ficus hirta, Vahl, Biri.
Ficus heterophylla, L. f., As-is or Is-is.
Ficus polycarpa, Roxb.
Ficus radicans, var. *angulosa*, Miq., Taquin-
 nes.
Ficus hederacea, Roxb., Haguimit.
Ficus subracemosa, Bl., Haulil.
Ficus racemifera, Roxb., Tabuyog.
Ficus glomerata, Willd., Aymit.
Ficus cuneata, Miq., Dungarug.
Ficus leucopleura, Bl., Lagnob.
Ficus radiata, Dcne, Lagnob.
Ficus pseudo-palma, Blanco, Sulamlog.
Ficus pilosa, Reinw., Taquines.
Ficus nuda, Miq.
Ficus callophylla, Bl.
Ficus conocarpa, Miq.

REPORTS OF CHIEF BUREAU OF FORESTRY, P. I.

[Extract from report for 1902.]

Market price for manufactured lumber.

The following table shows the average prices of boards nine-sixteenths, seven-sixteenths, five-eighths, three-eighths, one-half, and 1 inch in thickness per cubic foot:

Lauan-----	\$1. 00 to \$1. 12	Guijo-----	\$2. 25
Tanguile-----	1. 40	Acle-----	2. 50 to \$3. 00
Manicnic-----	1. 30	Calantas-----	3. 00
Molave-----	4. 00 to 4. 50	Batittinan-----	3. 00
Dungon-----	3. 00	Yacal-----	1. 80 to 1. 90
Panao-----	2. 00	Betis-----	2. 00
Apitong-----	1. 40	Banuyo-----	1. 50
Narra-----	4. 00 to 5. 00	Amuguis-----	. 83
Tindalo-----	4. 00	Balacat-----	1. 12
Ipil-----	4. 00		

Imported lumber.

Several departments of the United States Government in these islands find it necessary to import several million feet of manufactured lumber from the United States and Borneo, owing to the high prices and scarcity of native lumber.

The average prices paid for the above lumber is as follows, in gold, per thousand:

Oregon pine, laid down at Portland, Oreg-----	\$9. 00
Oregon pine, laid down at Manila, from-----	21. 65 to \$26. 50
Redwood, laid down at Manila-----	31. 50
Borneo lumber, laid down at Manila-----	65. 00

Cord wood.

Cord wood in the provinces costs from \$4 to \$7 per 1,000 rajas. Freight to Manila from \$12 to \$15 per 1,000 rajas.

Transportation by hand from dock to yards in Manila costs about \$4 per 1,000 rajas. Licenses to sell cord wood in Manila cost \$60 per year.

Market price of cord wood in Manila.

Rajas, superior class, sticks 4 to 5 inches in diameter and 3 feet long, \$40 to \$50 per 1,000 rajas. (At the present time, August, 1902, the price is \$56.50, but this is unusually high.)

Rajas, first-class, sticks 3 inches in diameter and 3 feet long, \$20 to \$30 per 1,000 rajas.

Rajas, intermediate class, containing sticks of both superior and first class, \$28 to \$35 per 1,000 rajas.

Split sticks, about 2 feet long and 1 inch in diameter, three to four sticks for 1 cent, according to grade.

Charcoal.

Charcoal sells for \$1 to \$1.20 per sack, containing 27 "gantas." Most of it, however, is sold to the natives by the ganta, the price ranging from 10 to 12 cents.

The forests of the Philippine Islands.

The various charts show from 948 to 1,725 islands, with a total area of about 119,542 square miles. Of this great number of islands the two largest are Luzon (47,238 square miles) and Mindanao (36,237 square miles). The next largest is Samar (5,040 square miles). There are eight others of more than 1,000 square miles and but six additional islands of more than 100 square miles, some fifty or more smaller islands of minor importance, thus leaving about 1,600 islands not worth mentioning, many of them nothing more than great masses of rock and sand, with little plant life visible.

The area of the Philippine Islands as given by various Spanish engineers runs between a little less than 70,000,000 to a little more than 73,000,000 acres. The forest area was estimated by Fernando Castro in 1890 at about 48,112,920 acres. This estimate includes all woodland, public and private. The area of private woodlands held under a good title is far below 1,000,000 acres.

All owners of private woodlands must register their titles to such lands in the forestry bureau at Manila before cutting for the market any timber or firewood on such property. If these titles are not registered in the forestry bureau, the wood cut is charged for as if cut on public lands. At present the total area of private woodland registered in this bureau is about 250,000 acres.

As far as we can learn from the former forestry officials in these islands no scientific examination was ever made of the stand of timber. This work is now being carried on by field parties from the forestry bureau. Field parties have examined the forests in the provinces of Bataan and South Camarines, and are now in the forests of Mindoro and Baler. These parties inaugurate their work by a preliminary reconnaissance of the region. They then make a detailed investigation of the amount and varieties of standing timber, measuring and noting carefully every tree included in the sample acres selected. A botanical collection is made at this time. A log at least 6 feet in length is taken from the tree from which the leaf, fruit, and flower are taken.

There are between 600 and 700 native tree species, of which there is some information, but there is great confusion in both scientific and popular names of tree species which it will take much time to correct. Upward of 50 species are found on an acre and several hundred species in a comparatively limited region. From Bataan Province alone we have valuation surveys on about 600 average acres, and before the work is closed some 500 more will be added. From these surveys much interesting information will be gathered concerning the stand and varieties of timber, their peculiarities of growth, character of the soil, and rock formation. (See chapter on Bataan.) In addition there will be notes on methods and cost of logging, labor, means of transportation, character of roads and streams, as well as a topographical map, on which will be shown the location of the valuation surveys, thus enabling any one to see at a glance the amount and value of timber available and the possibilities of bringing it to market.

This investigation will extend all over the islands, as trained men, capable of managing such work, are secured from the United States.

A preliminary examination of the forests of the Philippines shows that they have been almost entirely destroyed in many places. This line of destruction seems to follow the line of civilization. In Cebu—the first island settled by the Spaniards—almost every stick of merchantable timber has been cut away, and no good reproduction has ever taken place. In Panay and Negros, as well as in many provinces of Luzon, very little merchantable timber of a high grade is to be found.

A trip on the railway from Manila to Dagupan will not reveal much good timber within several miles of the road. In many of the islands the good timber has been cut away for about 3 miles back from the coast. But as we leave the centers of civilization, we soon run into virgin forests, where the stand of timber over 20 inches in diameter averages in places close to 7,000 cubic feet per acre; some sample acres show more than 10,000 cubic feet. In the total of forty odd million acres of woodland, we find at the very least 20,000,000 acres of virgin forest. We find virgin forests in the provinces of Cagayan, Isabela, Nueva Viscaya, and in that part of Tayabas formerly known as Principe and Infanta; in fact, the entire east coast of Luzon, south to Atimonan, is a virgin forest. The above-mentioned forests in Luzon will aggregate an area of at least 3,000,000 acres.

The above is a conservative estimate, and any change made later will undoubtedly be to increase the estimate instead of reducing it.

There is much merchantable timber left in the provinces of Tayabas, Camarines, parts of Bulacan, and Bataan.

The islands of Mindoro and Paragua, each containing an area of more than 2,000,000 acres, are covered with a dense stand of virgin timber.

Mindanao, with an area of 23,000,000 acres, contains more than 10,000,000 acres of virgin forest. Samar and Leyte—both large islands—are heavily timbered.

All of these latter islands are well supplied with water courses sufficiently large for driving logs. Many of these streams need a little clearing before driving could begin. One fine tract of timber near Manila has been protected up to the present time by a small obstruction in a stream that an American logging company would have removed in a very few days and at slight expense.

A glance at the topography of the islands will show the logger that the average length of haul to tide water is a short one. A combination of a short line of railway with the wire-cable system of logging would be ideal for a country with a topography such as these islands present. The methods of logging are very crude, as the carabao is relied upon as the principal means of transportation. The methods of felling trees are slow and antiquated. Wasteful methods of cutting are evident everywhere, and it is extremely doubtful if an average of 35 per cent of the merchantable timber cut is taken from the forest to the market.

Several hundred varieties of native woods are received in the Manila market during the year. Spanish engineers tested and described only some 70 varieties, so that we have many species in the market to-day that are not popular, owing to the lack of reliable information concerning their strength, durability, and suitability for construction purposes. Where strength and durability are especially desired there are no finer construction woods in the world to-day than molave, ipil, and yacal.

There are many other native woods which, when tested, will find a place with those just mentioned.

We have a number of woods which will attract the fine-furniture makers, of which may be mentioned narra, tindalo, camagon, ehano, calamansanay, tucan-calao, and alintao. These varieties are found all over the islands. We find also 11 different oaks, cedar in abundance, teak, and many other species awaiting investigation to bring out their value.

At this time no more than a mere mention will be made of the fact that there are large areas in the southern islands of this group where gutta-percha and a good quality of rubber are found. The islands are rich in other gums, in a great variety of valuable dyewoods, and other forest products that time and enterprise will develop.

At present very little cutting is going on in the virgin forests of the islands. Nearly all of the cutting is found in those provinces and islands which have been cut over for many years. Two or three licensees have established themselves at good points in virgin tracts, and there is no reason why satisfactory returns should not be realized from cuttings in such places.

It would be difficult at this time to even approximate the present value of the timber on public lands in the Philippines. Statistics of this office show that several hundred varieties of native woods are brought to market in the islands and are disposed of at a fair price. The government charges for the past year on this great variety of woods averaged a little over 6 cents Mexican per cubic foot Spanish. This charge has continued to remain between 5 and 10 per cent of the market price of timber in Manila.

It will be safe to assume an average stand of about 3,500 cubic feet English or 4,600 cubic feet Spanish, although the valuation surveys give double this estimate of merchantable timber (over 20 inches in diameter) on each acre of the 20,000,000 acres of virgin forests in these islands.

At the above valuation of 6 cents per cubic foot, it is evident that the value to the Philippine government of the above timber is more than \$100 gold per acre. By removing this timber under the supervision of forestry officials, each forest tract will gradually improve in value, and while realizing the large sum mentioned, the value per acre of public timber land will eventually approach its true and permanent value, which will be much nearer \$200 gold per acre than \$100; i. e., after the great mass of mature and overmature timber is removed, the revenue from the sale of the annual increase of growth of public timber will, under careful supervision, bring to the State a fair interest on the valuation per acre as given above.

The remaining public woodland, about 28,000,000 acres, will average in value not less than one-half the value as given for the virgin forest. A small part of

this remaining woodland will be taken up as mineral land and for agricultural purposes. After three centuries of civilization in the islands, we find but 6,000,000 acres improved out of a total area of 63,000,000 acres. It will be safe to assume that the Forestry Bureau will have at least 20,000,000 of the 28,000,000 acres to protect and improve for many years to come. This area, added to the 20,000,000 acres of virgin forest, will give to the state an area of 40,000,000 acres of valuable woodland.

By diverting the efforts of the timber cutters to the virgin forests, and by a rigid protection of the remaining woodland, the value of the total area will, in about thirty years, reach a value undreamed of to-day by those not familiar with what rational forestry is capable of accomplishing.

The United States market is not considered in this proposition. The Philippine market will be strong for many years. The Chinese market is always strong, and always will be, as all of lowland China is without timber. The Philippine construction timber is considered by many engineers in China the best timber to be had in the Orient. Strong as has been the Chinese market for timber in the past, the future promises even better, as there are indications that foreign enterprise and capital are securing concessions which will awaken that vast Empire.

[Extract from Report for 1905.]

The Sawmills of Manila.

There are about 40 sawmills in Manila. Of this number, 3 mills—those of John Gibson, the Philippine Lumber and Development Company, and the B. W. Cadwallader Company—are American steam mills of the best type, equipped with band saws and other modern machinery. The Manila sawmill and the mill of Tuason & San Pedro are steam mills, equipped with vertical gang saws and circular saws. The remaining mills are small concerns, which deal in logs and lumber, saw by hand, and occasionally send logs to the steam mills to be sawn.

When the steam mills were introduced it was very difficult to secure reliable native labor and competent mill men. Difficulty was also experienced in sawing the hard woods, such as betis and dungon. These difficulties have now been overcome and the mills are operating in a very satisfactory manner.

The sawing capacity of the 5 steam mills is about 2,500,000 board feet per month, while the amount of timber received per month, in logs, in Manila averages only a little over 1,000,000 feet B. M. Mills experience much difficulty in securing logs with which to fill their orders, so that their sawing is regulated largely by the quantity of logs received.

The American mill men find it very difficult to do business with the Chinese and natives who bring timber into Manila. The latter receive a shipment of logs, and often will not sell for any price until they have had two or three weeks to investigate the market, and then, if they find the market short, are likely to advance the price 50 or 60 per cent. To make themselves independent of the slow business methods in vogue, the three American mill managers are considering the feasibility of establishing a depository for logs of the most common species. They will then be able to ship timber into Manila in excess of running requirements, and buy in the local market only when timber is plentiful. It is obvious that such a depository would be of great benefit to the American mills, as expensive shut downs would cease. It would also tend to regulate the shipments of timber and would reduce the present great fluctuations in price.

At the Manila sawmill and the mill of Tuason & San Pedro all sawing is done by circular saws and vertical gang saws. The lumber produced is of first-class quality, and these mills are competing successfully with the American mills, even though they lack many of the labor-saving devices possessed by the latter.

More than half the timber brought into Manila is in the form of square logs, and it is those logs that give the mill men the most trouble, for most of them are quite dry and are much more difficult to saw for this reason.

The amount of sawing done by the hand mills has gradually decreased since the introduction of the steam mills, until at present very little lumber is being thus sawn for the market, the steam mills being able to saw at one-third to one-half the cost at which sawing can be done by hand.

The number of small hand mills and the volume of business done by them has not been affected by the operation of the large American mills, but the nature of their business has changed. The sawing is now a minor consideration,

the purchase and sale of logs and lumber and contracting now comprising the more profitable part of their business.

The cost of sawing the native hard woods varies according to the hardness, toughness, and character of fiber of the wood. The price for sawing varies from \$6.50 to \$20 gold per thousand feet B. M.

White Ants (Anay).

Small blocks of lauan and apitong, prepared by the bureau of government laboratories, were placed near a nest of white ants at the timber-testing laboratory on April 25, 1904; location in sandy soil, near the Pasig River. On June 9, 1904, the blocks were examined and all were found to be in good condition. They were replaced and examined again on March 28, 1905, when their condition was found to be as follows:

Set No. 1.—Saturated with $\frac{1}{2}$ per cent of a solution of naphtholene in benzole: Lauan badly decayed and slightly attacked by white ants. Apitong, slightly decayed, but not attacked by the white ants.

Set No. 2.—Saturated with 1 per cent of zinc sulphate in water: Lauan, badly decayed; not attacked by the white ants. Apitong, slightly decayed; not attacked by the white ants.

Set No. 3.—Treated with $\frac{1}{100}$ solution of bichloride of mercury: Lauan, in excellent condition; not attacked by the white ants. Apitong, in excellent condition; not attacked by the white ants.

Set No. 4.—Untreated: Lauan, badly decayed and badly attacked by the white ants. Apitong, slightly decayed; not attacked by the white ants.

The United States Forest Service has forwarded to this bureau 108 pieces of Pacific coast timbers for the purpose of testing their resisting qualities in the Philippine Islands to decay and the attack of the white ant.

These specimens comprise ten of the most important United States timbers, viz, red fir, western hemlock, spruce, white spruce, lodgepole pine, California redwood, sugar pine, white pine, cedar, and mountain pine. These specimens were secured from various sawmills in the Western States from California to Montana.

They were divided into three sets. One set was untreated and the other two sets were treated with creosote and a solution of mercuric chloride, respectively.

The specimens were planted, as per instructions, near Station No. 2, on the Lamao Forest Reserve on July 5, 1905. A report on the results of this test will be made some time during the coming year.

REPORT ON THE ECONOMICAL USE OF NATIVE AND IMPORTED WOODS FOR CONSTRUCTION PURPOSES IN THE PHILIPPINE ISLANDS.

By W. E. PARSONS, Consulting Architect.

[Extract from Official Gazette, Aug. 15, 1906, p. 498.]

The following is a report of the Consulting Architect, dated July 17, 1906, on the economical use of native and imported woods for construction purposes in this climate, furnished at the request of the Commission, and is published for the information of Insular, provincial, and municipal officials:

"For the consideration of this subject, it is convenient to consider the various kinds of woods used for building purposes in the Philippines, as divided into three general classes: (1) Native hard woods, (2) native soft woods, and (3) imported soft woods.

"The questions at issue are: First, the use of hard wood as opposed to soft wood economically considered; and, secondly, a comparison of soft woods, native and foreign.

"Considering the first question, in the opinion of the undersigned, timber buildings, the structural members of which are of hard wood, are the more economical in the long run. By structural members are meant those parts which serve to support or brace the building or any parts of it; such are posts, columns, girders, beams, joists, sills, braces, plates, trusses, and purlins. By hard wood is meant those woods of the first and second groups commonly used for building purposes, such as molave, ipil, dungon, tindalo, narra, acle, guljo.

"Experience has shown that of these, certain woods are preferable for uprights, certain ones for beams. Molave is commonly used for posts at the foundation, where the construction is liable to the attack of ants and subject to decay.

"Nonstructural members are those parts not essential to the strength of a building; if decayed or ant-eaten, they can be removed and replaced, without impairing the stability of the building; such parts are nonbearing partitions, doors, sheathing, screen, louveres, etc., and these may be of soft wood. It is essential also that parts exposed to the elements and floors be of wood of good quality, some of the less expensive hard woods being useful for this purpose. Such woods are guljo, apitong, and supa.

"Attention is respectfully invited to another point almost as important as the selection of the wood—the necessity of open or exposed construction. Since the anay are very sensitive to the light, and can live only in the dark, it is essential that constructive members be open and exposed to the light. All furring, sheathing, casings, double partitions, and similar construction, so common in America, should be avoided in this country.

"Secondly, a comparison of native and imported soft woods involves chiefly lauan and balacbacan of the former class, and Oregon pine and California redwood of the latter. The use, however, of redwood is insignificant compared with pine and may not be considered here. Lauan is probably the most abundant of timber trees in the Islands. Oregon pine has up to the present time had the advantage (1) of being obtainable in large quantities on short notice; (2) of being better seasoned and in general more even in quality than lauan; (3) its tensile and compressive strength is slightly greater.

"Lauan and balacbacan and native woods of this group have the advantage of being usually free from knots and consequently easier to work. These woods are also superior in interior work where natural finish is desired. One of the chief difficulties with the use of lauan and similar woods has been the lack of proper care in selection and seasoning. It varies greatly in quality; with the result that many persons who have been unfortunate in using inferior lots have become much prejudiced against it. The better qualities are found in the

large trees where the fibers are much more compact than in the younger trees. Little or no attention has been given to seasoning, for the mills have been in the habit of sawing to order, in order to avoid carrying in stock large quantities of sawn lumber; the mills have not facilities for kiln-drying lumber in large quantities. There is a small kiln in use at the Gibson mill in which wood for furniture is seasoned. The lauan seasoned there is giving entire satisfaction.

"The Insular Lumber Company, with cuttings in Negros, is confident of the success of lauan and is preparing for large deliveries of well-seasoned, kiln-dried material at a lower cost than Oregon pine.

"It is claimed that lauan and other similar woods can be successfully treated with creosote, adding greatly to its durability: whereas with Oregon pine, such treatment is not practicable. Experiments show that creosoting costs about \$0.10 (United States currency) per cubic foot.

"While it is certain that no wood is really anay-proof, there being cases where even molave has been destroyed, yet Oregon pine is considered the material most liable to be attacked. The fact that a good many pine buildings have stood the test for four or five years has encouraged many builders to use it extensively and run the chances of white ants. It is stated that new wood is less likely to be attacked than old, this fact being accounted for by the stronger odor of new wood.

"There is a strong and increasing demand, in private work, for Oregon pine, both by Americans and Filipinos. One of the prominent lumber dealers, John Gibson, who heretofore has carried only native lumber, has found it necessary to carry a large stock of pine and redwood.

"Attention is respectfully invited to a comparison between former and present building methods and materials employed in these Islands. Formerly the timbers, stone, mortar, bricks, and tile roofing, and nearly all the materials for building construction, were of native production. At present there is a strong tendency toward the construction of entire buildings of imported materials, in which Oregon pine and galvanized-iron roofing form a conspicuous part.

"From the economical as well as from the architectural point of view, it is respectfully recommended that soft woods, both native and imported, be excluded from use as structural members in all permanent public buildings.

"W. E. PARSONS, *Consulting Architect.*"

(Circular No. 1.)

OPPORTUNITIES FOR LUMBERING IN THE PHILIPPINE ISLANDS.

BUREAU OF FORESTRY,
Manila, P. I., December 1, 1906.

OWNERSHIP OF FORESTS.

The Philippine public forests cover an area of more than 40,000,000 acres. Less than half a million acres of forest are held by private owners. Under an act of Congress in 1902 the Philippine forests can not be sold, leased, or homesteaded unless the same are more valuable for agriculture than for forest purposes.

LICENSES TO EXPLOIT THE PUBLIC FORESTS.

Exclusive licenses may be granted for terms up to twenty years. These give the holders sole right to exploit certain forest products. The extent of the territory thus granted depends upon the size of the plant to be installed. No charge is made for such a license, and only stumpage charges are imposed. These charges range from ₱0.50 to ₱2.50 per cubic meter, or approximately from \$1 to \$5 (United States currency) per thousand feet B. M. Such an arrangement is preferable to buying the land, since no land taxes are incurred. There are a number of desirable tracts of public forest of large extent now unexploited.

TARIFF RATES.

There are no export duties on timber or on the manufactured product. Logs imported into the United States are admitted free. The import duty at Manila on sawmill and logging machinery is 5 per cent ad valorem.

FREIGHT RATES TO MARKET.

Freight rates from Manila to the Pacific coast amount to \$7 (United States currency) per ton (logs), about 40 cubic feet, or \$12 to \$14 per thousand feet B. M. Freight rates from Manila to the Atlantic coast of the United States are \$14 to \$15 (United States currency) per thousand feet B. M., or \$8 per ton of 40 cubic feet; light-weight material, \$5 per 40 cubic feet.

Distances to market.

Distance from—	Manila, P. I.	Cebu, P. I.	Iloilo, P. I.	Hongkong, China.	Shanghai, China.	Sydney, Australia.
	<i>Miles.</i>	<i>Miles.</i>	<i>Miles.</i>	<i>Miles.</i>	<i>Miles.</i>	<i>Miles.</i>
Seattle, U. S. A.....	6,400			6,300	6,200	6,800
Cadiz, Negros Occidental.....	400	140	70	800	1,300	3,370
Bongabon, Mindoro.....	200			700	1,200	3,570

CONSUMPTION OF LUMBER.

	Board feet.
Amount of lumber used in the Philippine Islands per year, approximately	100,000,000
Amount of American pine used in China during the past year.....	85,000,000
Amount of American pine used in Australia during the past year...	63,000,000

PHILIPPINE TIMBERS.

In Bulletin No. 4 of the bureau of forestry thirty common Philippine timbers are discussed. In this bulletin extensive tests show the qualities of the timbers. There is also a brief description of the different woods. Common Philippine timber as good as American pine can be laid down at tide water for about the same price as pine on the Pacific coast. Difference in freight rates, low stumpage, and cheap labor should combine to make a low rate on the manufactured Philippine product in the Chinese and Australian markets and should gradually replace the American product.

STAND OF TIMBER.

In Bulletins Nos. 5 and 6 can be obtained the actual stand of timber on tracts in Negros and Mindoro. These show 10,000 to 32,000 board feet per acre. The lower slopes of Mount Silay in northern Negros are practically covered with merchantable timber. One block of this forest, 69 square miles in area, shows a stand of 32,050 board feet per acre of merchantable timber over 20 inches in diameter. A large area of similar forest on Mount Silay adjoins this tract and awaits the lumberman. In the southwestern part of this province (Negros Occidental) is a large area of valuable forest which will be close to the southern terminus of the new railway.

There are a number of regions in these islands where dense forests of valuable timber are found which have never been exploited for the market. The Agusan Valley, in Mindanao, 4,000 square miles in area, is almost entirely covered with virgin forest and drained by large streams. The dense forests on the coast of Mindanao are also unexploited.

LABOR PROBLEM.

Labor is not difficult to secure. The wages range from ₱0.50 to ₱1.50 (\$0.25 to \$0.75, United States currency) per day. Filipinos are apt at handling machines of all kinds and work satisfactorily when treated with consideration. Skilled American loggers and lumbermen, assisted by Filipino crews, should get out logs and manufactured material at prices not far from those quoted for pine on the Pacific coast, especially in regions where we find 30,000 board feet of merchantable timber on each acre close to tide water, and where no special logging difficulties are encountered.

LOGGING.

Logging is carried on during the entire year in many provinces. In some places logging is suspended during the seasons of heaviest rains, a period of from two to four months. The logging methods are very crude.

Many of the native woods will float, and, if handled by the expert raftsmen of the Pacific coast, could be rafted 200 to 600 miles through the quiet inland seas to Manila, and possibly to China, which is about 660 miles from Manila. Not one of the lumber companies of the Pacific coast is actively interested in exploiting the Philippine forests.

LUMBER DEALERS.

The leading lumber dealers in the Philippine Islands are: John Gibson, Insular Lumber Company, Cadwallader & Co., Philippine Lumber and Development Company, Tuason & Sampedro, California-Manila Lumber and Commercial Company.

The offices of these companies are in Manila. For discussion of sawmills see Bulletin No. 4.

CAPITAL NECESSARY TO ESTABLISH LUMBERING OPERATIONS.

The question is often asked, "What capital is necessary to carry on a successful lumbering enterprise in the Philippines?" Such an enterprise should not be attempted unless the company intends to handle the product from start to finish, including transportation, lumber yards at the principal markets, supply stores for use of employees in the forest, etc. This would probably involve the employment of not less than \$200,000 (United States currency). A company contemplating logging operations should send a practical logger to look over the ground with an officer of the bureau of forestry.

SUMMARY OF LUMBERING POSSIBILITIES ON ONE TRACT OF PUBLIC FOREST IN NEGROS OCCIDENTAL.

In Bulletin No. 5 of the bureau of forestry a description is given of the forests and lumbering operations near Cadiz, Negros Occidental. The summary of this bulletin is as follows:

Area of tract, 69 square miles; area in forest, 37,668 acres.

Stumpage charges on this tract are collected on manufactured lumber and average less than \$1.20 (United States currency) per thousand feet B. M.

Six tree species constitute about 90 per cent of the total stand of merchantable timber on the entire tract.

Amount and value of merchantable timber on tract over 20 inches in diameter.

Species.	Stumpage charge, M feet B.M. (approximate).	Feet B.M. per acre.	Total yield, M feet B.M.	Manila price, M feet B.M.	Value per acre.	Total value.
Apitong.....	4	5,140	193,572	90-115	460	17,421,480
Almon.....	2	7,150	269,269	70- 90	500	18,848,890
Balabacan.....	4	4,640	174,742	70- 90	325	12,231,940
Mangachapuy (Red Lauan).....	2	13,240	496,618	70- 90	925	34,906,260
Lauan-bagtican and Lauan-dunlog.....	2	1,880	70,801	70- 90	130	4,956,070
Total.....		32,050	1,207,002		2,340	88,361,580

₱2 equals \$1, United States currency.

SUMMARY OF LUMBERING POSSIBILITIES ON ONE TRACT OF PUBLIC FOREST IN MINDORO.

In Bulletin No. 6 of the bureau of forestry a description is given of the forest and lumbering possibilities of one tract on the east coast of Mindoro. The summary of this bulletin is as follows:

Area of tract, approximately 85 square miles; area of tract surveyed, 55 square miles; area of part of commercial forest (measured), 11,339 acres (not including mangrove swamps).

Stumpage charges on this tract average less than \$2 (United States currency) per thousand board feet.

Seven merchantable tree species constitute about 50 per cent of the total stand on this tract.

Amount and value of merchantable timber on 11,339 acres of forest (trees over 16 inches in diameter).

Species.	Stumpage charge per M feet B.M. (approximate).	Yield M feet B.M.	Manila price.	Total value at lower prices.
Narra.....	10	4,534	225-275	1,020,150
Hagachac.....	2	17,283	90- 115	1,555,650
Lauan.....	2	46,404	70- 90	3,252,480
Amugul.....	4	11,378	110- 150	1,251,580
Guijo.....	6	13,973	98- 140	1,368,354
Apitong.....	4	4,174	90- 115	375,660
Sacat.....	4	3,420	100- 150	342,900
Total.....		101,237		9,166,724

A total yield of 101,237,000 feet B. M. on 11,339 acres, or about 9,000 feet B. M. per acre. Lumber worth ₱810 per acre.

AID FROM THE BUREAU OF FORESTRY.

A study of Bulletins Nos. 5 and 6 of this bureau will indicate to the lumbermen what the bureau will do for them. Forest officers will use every effort to make such propositions succeed financially. Upon request samples of wood may be obtained at the office of the bureau of forestry.

GEORGE P. AIERN, *Director of Forestry.*

[Bulletin No. 4—2d Edition.]

By ROLLAND GARDNER, *Manager of the timber-testing laboratory.*

BUREAU OF FORESTRY,
Manila, July 2, 1907.

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II. PHILIPPINE SAWMILLS, LUMBER MARKET, AND PRICES.

Manila is the principal lumber market of the Philippine Islands. Here are located five of the most important mills. Timber is being shipped to them from all parts of the Islands. Three of these mills are equipped with heavy band saws and other modern machinery. The other mills are equipped with vertical gang and circular saws. The combined maximum daily output of the five mills is about 90,000 board feet per day. One mill has a capacity of 30,000 board feet, two of 20,000 board feet, and two of 10,000 board feet per day.

During the early operations of the mills in Manila, they had to contend with numerous difficulties; Filipino labor was unreliable; many of the hard woods were difficult to saw and it was impossible to secure a sufficient supply of logs from the provinces with regularity. Conditions have improved, however, during the past two years, and the mills are now operating in a very satisfactory manner. They now saw all commercial woods without difficulty and are depending more and more upon their own cuttings to supply logs to meet their requirements. With proper training, Filipinos are found to be apt in handling machinery. Two of the mills have recently been running at night to fill orders.

Some confusion exists in the market regarding the identity of a few of the leading commercial woods. This is especially true of Lauan. At least six different woods are now being marketed under that name. From the commercial standpoint this is not important, however, as all of these woods resemble the true Lauan (*Shorea contorta*) closely and are of about the same quality. There are several different kinds of wood being sold for Apitong, and occasionally Apitong is sold for Guijo. Lauan, Apitong, and Guijo are used to a larger extent than any other fifteen native woods.

Logs are bought and sold by the Spanish cubic foot. One Spanish cubic foot equals 0.765 of an English cubic foot. Lumber is bought and sold by the thousand English board feet.

In sawing the average-sized logs that are brought into the market, between 5 and 6½ board feet are obtained from 1 Spanish cubic foot, but in the large-sized logs sometimes as high as 8 board feet are cut from 1 Spanish cubic foot.

Until quite recently it has been practically impossible to obtain well-seasoned lumber in the market. The mills have been accustomed to sawing to order, consequently lumber was seldom in the yards a sufficient length of time to become seasoned. There were no facilities for kiln drying lumber in large quantities. Two small kilns were erected several years ago, but they were of small capacity and have not been used extensively. One of the leading mills has recently installed a kiln of about 50,000 board feet capacity which is operating very satisfactorily. This kiln is capable of drying 100,000 board feet or more of native lumber per month, the amount depending upon the texture and thickness of the lumber. This concern is now using kiln-dried native lumber in its cabinet factory and is preparing to kiln dry Oregon Pine and California Redwood for use in its planing mill.

A considerable amount of imported lumber is still used in the Islands. Most of this is Oregon Pine and California Redwood. During the period from July 1,

1904, to June 30, 1905, 29,679,644 board feet of lumber and timber, and 9,261 pieces of timber (dimensions not known) were imported. During the same period, 139,148.77 cubic meters of native timber were cut. If this were all sawn into lumber, it would make about 40,000,000 board feet.

The price of logs fluctuates from day to day. The following table gives the Manila market prices on August 1, 1907:

Manila market prices.

[Philippine currency.]

Kind of wood.	Logs per Spanish cubic foot.	Sawing per 1,000 English board feet.	Lumber per 1,000 English board feet.
Lauan	P0.30-0.35	P13.00-15.00	P70.00- 90.00
Apitong	.35-.37	16.00-18.00	85.00-100.00
Guijo	.50-.65	16.00-18.00	98.00-140.00
Molave	.80-.90	21.00-23.00	215.00-300.00
Yacal	.65-1.00	21.00-23.00	160.00-200.00
Yellow Narra	.70-.80	16.00-23.00	225.00-275.00
Red Narra	.75-1.00	16.00-23.00	250.00-300.00
Tanguile, or Balabacan	.33-.45	13.00-18.00	95.00-120.00
Sacat	.40-.75	15.00-18.00	100.00-150.00
Ipil	.76-.85	21.00-23.00	180.00-225.00
Dungon	.80-.90	38.00-40.00	185.00-200.00
Supa	.65-.70	21.00-23.00	140.00-220.50
Balacat	.40	18.00	100.00
Macaasin	.40-.75	15.00-18.00	110.00-150.00
Calantas	.65-1.20	13.00-15.00	180.00-200.00
Tindalo	.78-1.00	21.00-23.00	250.00-300.00
Amuguis	.40-.75	18.00-21.00	110.00-150.00
Acle	.85-1.20	16.00-23.00	280.00-300.00
Betis	.70-1.00	38.00-40.00	250.00-300.00
Bansalaguin	.46-.85	23.00	150.00-280.00
Palo Maria	.75-.80	18.00	140.00-160.00
Battinan	.65-.75	21.00-23.00	150.00-280.00
Aranga	.50-.75	21.00-23.00	150.00-160.00
Banuyo	.55-.75	16.00-18.00	140.00-220.00
Malugay	.60-.65	16.00-23.00	95.00-130.00
Mayapis	.35	15.00	90.00

The Government stumpage charges in the provinces where large stands of timber are found range from \$1 to \$5, gold, per 1,000 board feet.

Besides those in Manila, there are an increasing number of sawmills scattered through the provinces. Most of these are small, with capacities ranging from 2,500 to 10,000 board feet per day.

The operations of one company in Negros Occidental are more extensive than those of any other company in the Islands. It is operating two sawmills on a tract of 69 square miles, 60 square miles of which are covered with an unusually heavy stand of timber, averaging about 32,000 board feet per acre of merchantable lumber. The smaller mill which has been in operation since 1902 has a capacity of 20,000 board feet per day but the daily cut is about 12,000 feet. The other mill which has recently been completed is a modern band mill of the best type with a capacity of 100,000 board feet per day and should saw at least 60,000 board feet per day when a mill crew has been trained. The trees known by the Visayan names of Balabacan, Mangachapuy, and Almon are being cut principally; the first two are sold in Cebu, Iloilo, and Manila as Balabacan and Red Lauan. Almon has the market name of White Lauan. This company is able to sell Lauan cheaper than other lumbermen, getting about P60 per 1,000 board feet for it in Manila. The company logs in a modern manner with donkey engines for skidding and a narrow-gauge railroad for hauling the logs to the mills. The company not only sells lumber in the principal markets of the Islands—Cebu, Iloilo, and Manila—but also has begun exporting the best grades to the United States.

Another company has a mill located on the Island of Basilan, which is cutting about 6,000 board feet of lumber per day. This lumber is marketed in Zamboanga, Iloilo, and Cebu. The Zamboanga prices quoted by this company are as follows:

	Per 1,000 board feet.
Lumbayao	₱72.00
Guijo	80.00
Calantas	80.00
Yacal	140.00
Camagon	300.00
Tindalo	180.00
Ipil	180.00
Lauan	50.00
Narra	200.00

Planing, ₱7 extra per 1,000 board feet.

Another company, a branch of a Manila milling company, has recently installed in Mindoro a circular-saw mill with a capacity of 5,000 to 10,000 board feet per day. The lumber is shipped to Manila.

Near Bagulo, Benguet, the summer capital of the Philippine Islands, there are three small mills sawing Benguet pine, which sells in Bagulo and vicinity for ₱75 to ₱95 per 1,000 board feet. The capacity of these mills ranges from 2,500 to 6,500 board feet per day.

A small mill has recently been installed at Gattaran, Cagayan, which supplies Aparri and the towns in the Cagayan Valley with lumber. This mill charges ₱0.80 per English cubic foot for first group timber in the log, and ₱20 per 1,000 board feet for sawing.

About 2,500 board feet per day is the capacity of a mill which is cutting Agohe (*Casuarina equisetifolia* Fors.) almost exclusively at San Antonio, in the province of Tarlac. This is put on the market at Manila for ₱100 per 1,000 board feet.

A new company has recently received a timber concession in the Province of Tayabas and is now erecting a sawmill having a capacity of 15,000 board feet per day.

To supply the rapidly growing demand for timber for the new railroad in the Islands, preparations are now being made to install small mills at several places in the provinces.

The sawmills at present operating in the Philippine Islands, or nearly completed, are as follows:

Location.	Maximum daily output (board feet).	Principal markets.
Manila, P. I.	30,000	Manila.
Do.	20,000	Do.
Do.	20,000	Do.
Do.	10,000	Do.
Do.	10,000	Do.
Oadiz and Sagay, Negros Occidental.	15,000	Manila, Cebu, Iloilo, and New York.
Do.	60,000	Do.
Gattaran, Cagayan.	(*)	Local.
Felisen, Lepanto-Bontoc.	1,500	Do.
Bagulo, Benguet.	2,500	Do.
Do.	3,500	Do.
Do.	4,000	Do.
Bayombong, Nueva Vizcaya.	(*)	Do.
San Antonio, Tarlac.	2,500	Manila.
Murcia, Tarlac.	(*)	Local.
Bollano, Pangasinan.	(*)	Do.
Pinamalayan, Mindoro.	5,000	Manila.
Mamburao, Mindoro.	5,000	Local.
Mangarin, Mindoro.	10,000	Manila.
Guinayangan, Tayabas.	15,000	Do.
Bagay Gulf, Ambos Camarines.	(*)	Do.
Tacloban, Leyte.	3,000	Local.
Palompan, Leyte.	4,000	Cebu and local.
Dumaguete, Negros Oriental.	3,500	Local.
Iloilo, Iloilo.	4,000	Iloilo.
Isabela, Basilan Island.	6,000	Zamboanga.
Zamboanga, Moro.	(*)	Local.
Cotabato, Moro.	(*)	United States Army.
Parang, Moro.	6,000	Do.
Marahul, Moro.	(*)	Do.
Sibuguey Bay, Moro.	(*)	Local and Philippine railway.

(*) Small mill.

PHILIPPINE WOODS.

By FRED W. FOXWORTHY.

[Extract from The Philippine Journal of Science, C. Botany, October, 1907, vol. 2, No. 5.]

I. Introduction.

Much misinformation is current as to the names and characteristics of our native woods. A wood is often variously designated in the same or in different provinces and again, several different kinds are frequently found under an identical name, for example molave (*Vitex* spp.) has more than forty different names in the Archipelago, and this multiplicity of names for the same wood naturally results in confusion which is very much increased when, as often happens, the same name applies to different woods in different localities. This makes it very easy for the unscrupulous dealer to substitute a poor quality for a better. There is evident need of some quick and sure way of identifying the woods needed for furniture, construction, and other purposes, and therefore it has seemed desirable to prepare a brief guide and description of those which are found in commercial quantities in the Manila market. This has been a task of some difficulty, because of their large number and the unsteady and uncertain supply of any one species at any given time.

There are about sixty-five commercial woods furnished by about one hundred species which are nearly always to be found in Manila, and in addition, there are several times as many which may occasionally be brought here in small quantities, so that the resulting complication is considerable. It follows that the chances for error are very great; so that this paper at best can be only preliminary to the more complete work indicated by the title.

PREVIOUS WORK.

But little has been done in the way of careful study of the native woods; the literature is as follows:

VIDAL Y SOLER (D. DOMINGO).—Manual del Maderero en Filipinas (1877), and other works by the same author.

Scattered notes by other Spanish authors.

FOREMAN (JOHN).—The Philippine Islands. London (1899), 2d edition, 367-373; (1906), 3d edition, 312-317.

This author gives notes on some of the best-known commercial woods.

AHERN, GEORGE P.—Important Philippine Woods. Manila (1901).

This is a compilation of notes from previous writers. This book brought together what had been written of the Philippine woods before 1901.

GARDNER, R.—Mechanical Tests, Properties, and Uses of Thirty Philippine Woods. Manila, *For. Bur. Bull.* (1906), 4, 2d edition (Aug. 1907).

WHITFORD, H. N.—A preliminary Check-list of the Philippine Commercial Timbers. Manila, *For. Bur. Bull.* (1907), 7. (In press.)

The last two publications are most useful at the present time and they have been quoted extensively in this paper.

SCOPE AND METHODS OF THE PRESENT WORK.

In this paper the attempt has been made to give: 1. A general and technical discussion of wood. 2. A key to the common commercial woods. 3. Short notes on the structure, appearance, common names, range, and usefulness of individual species. 4. A very complete index.

Botanical material has furnished the starting point in correlating the name and wood which should go together; the botanical determination being made

from herbarium material taken from the same tree as is the wood specimen; when the scientific name has been fixed and the structure studied, the wood is compared with commercial material until the latter can be determined definitely under its different names. Sections, whenever necessary, and as many as were necessary, have been made to determine doubtful points of structure.

The usefulness of this paper should consist in the ready classification of the commoner native woods; in the better understanding of their uses; in the finding of new applications for them and in discovering the relationships existing between the woods of the Philippine Islands and those of the rest of the world.

In addition to the ones already mentioned, the following sources of information have been used:

Roth and Fernow. Timber. Bul. Bur. of Forestry, U. S. Dept. of Agriculture (1895), 10.

Gamble, J. S. A Manual of Indian Timbers. London (1902).

Janasonijs, H. H. Mikrographie des Holzes. Leiden (1906).

Each of the American foresters of the Philippine Forest Service has aided the writer with material and observations. Special acknowledgments, however, are due Dr. H. N. Whitford and H. M. Curran, of the Bureau of Forestry, for their constantly helpful observations and the large amount of material furnished by them for the study of different woods. The field notes of Mr. J. R. Hillsman, of the Bureau of Internal Revenue, have also been of service.

II. General Discussion.

1. STRUCTURE.

(a) Gross Morphology of Wood.

CLASSES OF WOOD.—All woody plants may be grouped according to their stem structure and botanical relationships as *Pteridophytes*, *Monocotyledons* (*Endogens*), and *Exogens*.

Pteridophytes.—The hard tissue is scattered in large, irregular bundles through the stem; the latter is uneven, being made up of soft and very hard material. *Tree ferns* are included in this class; they do not come into the market, but the trunks of certain species are used locally in Benguet and elsewhere in northern Luzon as posts for houses.

Monocotyledons or Endogens.—The wood is composed of scattered, small bundles of hard, woody tissue, the interspaces being filled with soft tissue. This group includes the *bamboos*, *palms*, *pandans*, etc.

Bamboos.—No work on the woods of the Philippine Islands would be complete without some mention being made of the bamboos which furnish so large a part of the structural materials of the Archipelago. Several different species are used, but they all agree in having the peculiar monocotyledonous structure already described, modified by the stem being hollow and jointed. They also contain a considerable proportion of silica.

The *palms* do not have jointed stems and are not hollow, but the central part of the stem is usually very soft and brittle. From the outer part, which is very hard and which will take a high polish, canes, bows, and other articles are made. *Palma brava* (*Livistona* spp.) and the coconut palm (*Cocos nucifera* L.) are the ones most used. Some palm stems are also suitable for the manufacture of small ornamental pillars, where the top and bottom are not exposed to the air, and where the defective nature of the inner part of the stem is not displayed. Palms are also to some extent used for flooring and for corner posts of houses.

The *bejucos* and *rattans* (*Calamus*, *Daemonorops*) also being in this group, but as they occur in such small dimensions they are not considered in this paper.

The *pandans* or *screw pines* (*Pandanus* spp.) are widely distributed throughout the Archipelago. They are from a number of different species of the genus *Pandanus*.

The outer part of the stem of the *Pandanus* is usually very hard. I do not know of its commercial use here, but in some Pacific islands it furnishes an ornamental wood similar in texture, but inferior in finish, to that of the coconut (*Cocos nucifera* L.) and *palma brava* (*Livistona* spp.).

Exogens.—The remainder of our woody plants may be grouped together as *Exogens*; that is, the stem consists of a woody cylinder which grows in diameter by the addition of concentric layers about the wood already formed; there are

two great groups; the *Gymnosperms*, or *Conifers*, and the *Angiosperms*, or broad-leaved plants. These may be distinguished as follows:

Conifers.—Wood, except in the first layer about the pith, containing no vessels; that is, nonporous; exceedingly regular in structure. There are a number of *Conifers* native to the Islands, but they are scattered in small patches or in almost inaccessible places on the mountains. The only native *Conifer* that is cut at all for timber is the Benguet pine (*Pinus insularis* Endl.) and it scarcely comes into the Manila market at all. However, a large amount of coniferous wood is imported; nearly all of this is California redwood or Oregon pine, although an occasional piece of coniferous timber from Australia, Japan, or China is encountered.

Angiosperms.—The remaining group, the broad-leaved trees, furnishes practically all of the Philippine wood found in the lumber yards, and further discussion will apply to woods of this group unless otherwise indicated.

PARTS OF THE STEM.

Pith, wood, and bark.—In examining the end of a log, three distinct areas are seen; namely, a small, central portion, the pith, made up of soft tissue; an outside, more or less corky covering, the bark, for purposes of protection; and, the wood, which is the hard tissue making up the greater part of the log and extending from bark to pith.

The pith is usually of very small diameter; it is rarely, as in Malapapaya (*Polyscias nodosa* Seem.), greater than one centimeter. This fact is of importance because the pith is an element of weakness in the wood.

Sapwood and heartwood.—The outer part of the log is often of a much lighter color, less in specific gravity and much softer than the center. The distinct, central part of the log is known as the heartwood and this outer portion is termed the sapwood. Many woods do not show any heartwood. The relative amount of sap- and heartwood is very variable according to the individual tree, the age and the part of the tree from which it is taken.

Pith-rays.—Radiating from the pith to the bark are connecting lines of soft tissue, the medullary or pith-rays. These are among the most important characteristics to be observed in the structure of a wood, since they have an intimate connection with both the strength and beauty. They differ in size in different woods, being very large and distinct in some, as for example in teluto (*Pterocymbium tinctorium* Merr.), catmon (*Dillenia* spp.), etc., and, in others, so small as to be invisible without the aid of a magnifying glass, as in acle (*Pithecolobium acle* (Blco.) Vld.), betis (*Illipe betis* (Blco.) Merr.), camagon (*Diospyros* spp.), or banaba (*Lagerstroemia speciosa* (L.) Pers.). The pith-rays may be all of the same size in the same tree, or there may be some large ones (the primary pith-rays) running from pith to bark, and some finer (secondary rays) starting beyond the pith. Compound pith-rays, where several are crowded together, may also occur. Pith-rays may take either a crooked or a straight course from the pith to the bark, but if curved, they usually are not abruptly so. The height of pith-rays is variable; they may be so short as scarcely to appear to have this dimension, or again it may be quite appreciable.

Growth rings.—The wood is formed in layers about the pith; and these may be formed only during certain seasons, the tree resting the remainder of the time. Where this is the case, each period of growth produces a ring about the pith. These rings are found in nearly all woods of temperate regions and in some of those of the Tropics. Where but one of them is formed during the year, it is called an annual ring, but manifestly, this name is not suitable for use with our woods, since we do not know whether one year sees the growth of one or of several. Consequently, the term annular, or seasonal growth rings has seemed preferable and will be used in this paper.

Seasonal rings seem to be characteristic of some of our woods only. It seems probable that the same species may have them when grown under one set of conditions and not under different ones. It also appears that many trees exhibit rings of seasonal growth when they are young but not afterwards. We have begun, in coöperation with the Bureau of Forestry, a series of observations on the manner and rate of formation of growth rings, but it will necessarily be some years before any safe general conclusions can be reached.

Distinct seasonal rings seem to be of constant occurrence in narra (*Pterocarpus* spp.), banaba (*Lagerstroemia speciosa* (L.) Pers.), calantas (*Toona* spp.), ipil (*Intsia* spp.), supa (*Sindora supa* Merr.), molave (*Vitex* spp.),

and several other woods, but there seems to be a considerably greater number where they are not so.

False seasonal rings.—A number of woods show distinct, concentric lines bearing a strong, superficial resemblance to seasonal rings. These false rings may be caused by lines of soft tissue, as is the case in dita (*Alstonia scholaris* R. Br.) and palo maria (*Calophyllum* spp.), where they are so close together as to make it unlikely that they will often be mistaken. Lines of whitish resin-canals often give the appearance of seasonal rings in lauan (*Shorea* spp.), apitong (*Dipterocarpus* spp.), yacal (*Hopea* spp.), guiño (*Shorea guiso* Bl.), etc. These may readily be distinguished from the true seasonal rings by their irregularity of occurrence and by the fact that they usually fade out before completely encircling the log, and where they are numerous some of them can usually be seen to do this even in a small piece.

Vessels.—Fine, tubular passageways are found in all of these woods; in observing the end view of the log they appear as pores or sieve-like openings.

Concentric lines of soft tissue are found in some woods. These may be fine or coarse, wavy, broken, or straight. They are of very constant occurrence and serve clearly to delimit certain groups. The size, number, and arrangement of the vessels as well as the relation of the soft tissue and vessels to each other and to the pith-rays is very important.

PLANES OF SECTION.

Each wood should be observed in the following three planes of section:

Cross section.—Any section directly across the stem at right angles to the direction of growth; in this the pith-rays appears as long lines from pith to bark.

Tangential section or slab cut.—Any longitudinal section parallel to the bark and at right angles to the pith-rays. This is the one used in making ordinary, cheap planking, and it shows what is known as the cat-faced or bastard grain. In this plane of section the vessels appear as long lines through the wood and the pith-rays are seen in end view.

Radial section.—Any longitudinal section parallel to the pith-rays. Here the pith-rays appear as flat, expanded surfaces and the vessels as long lines; the timber so cut is known as quartered or rift-sawn, and has the beautiful silver grain which is familiar to most users of wood. This is the best method of cutting to secure the maximum of beauty and strength, but the tangential cut is much the easier to make, as it necessitates less handling and involves less waste; however, it gives an inferior timber.

GRAIN.

This is the figure presented by the structure of the wood. It is fine or coarse, straight or crooked, according as the elements of the wood are coarse or fine, crowded or loosely put together, straight or twisted. The best grain of the wood is brought out by careful attention to the cutting. The occurrence of a knot or branch, an irregularity in the trunk or root, or some local imperfection in the wood, may produce a regional modification of the grain, causing what is known as curly, or bird's-eye grain, or burl. Specimens showing the latter are at times very pretty and are much prized for certain classes of furniture. One of the best-known modifications of the grain is found in the large buttresses or buttress roots of some of our trees; some of these are of sufficient size to furnish single-piece table tops. Narra (*Pterocarpus* spp.) is probably the most widely known for this purpose, but we have a number of different trees showing this habit. Tindalo (*Pahudia rhomboidea* Prain), palo maria (*Calophyllum* spp.), tanguile (*Shorea polysperma* (Blco.) Merr.), calantas (*Toona* spp.) may be mentioned among the trees showing the fancy burl or bird's-eye grain.

Spiral grain.—A tree in growing often takes a spiral direction as indicated by the twistings of the bark; this gives the grain a spiral twist and the wood, in splitting, shows a series of flutings. A moderately pronounced spiral or twisted grain is evident in a number of our woods which show a resistance to smoothing in planing and working. When planed in one direction, portions of the surface are smoothed and certain others are roughened, and when the operation is reversed, the smooth surface becomes roughened as the rough surface is smoothed. This irregularity of grain is often noticed in amuguis (*Koordersiodendron pinnatum* Engl.), lauan (*Shorea* spp.), guiño (*Shorea guiso* Bl.) and mayapis (*Anisoptera* spp.).

(b) *Minute Anatomy.*

Elements.—The elements making up wood are, vessels or tracheæ, tracheids, wood-fibers, pith-ray cells, and wood parenchyma cells.

Tracheæ, vessels, or pores are long tubes extending through the wood for some distance. Their size, arrangement in rows or scattering, and their relation to other elements are of great importance in the classification of woods. Large vessels are found in calantas (*Toona* spp.), lauan (*Shorea* spp.), and batitinan (*Lagerstroemia batitinan* Vld.); very small ones in bolongeta (*Diospyros* spp.), calamansanay and mancono (*Xanthostemon verdugonianus* Naves).

Wood-fibers.—These are long and slender, thick-walled cells, containing lignin in their walls. Their abundance and the thickness of their walls is usually sufficient to account for the weight and hardness of the wood.

Tracheids.—These are elongated, tapering cells, not so thick-walled as the wood-fibers, of relatively greater diameter, with walls more pitted and shorter.

Pith-ray cells.—These are short, prismatic, thin-walled cells containing starch grains, resin, or other deposits; they are nearly always with their long axes horizontal.

Wood parenchyma.—This is formed by thin-walled, prismatic cells, with starch or other inclusions. The cells are scattered with more or less regularity through the wood; the long axes being vertical. The wood parenchyma in some woods is arranged in fine, concentric or wavy, broken lines. These are usually of a lighter color than the surrounding tissue.

Pith-rays.—These are usually made up of unligified cells and extend in a radial direction.

Resin-canals.—These are passages lined with thin-walled cells which secrete a resin which is often found exuding from the cells into the central passage, or completely filling it. Resin-canals are found in but few of our woods; for example, Benguet pine (*Pinus insularis* Endl.), lauan (*Shorea* spp.), apitong (*Dipterocarpus* spp.), yacal (*Hopea* spp.), tanguile (*Shorea polysperma* (Blco.) Merr.), guijo (*Shorea guiso* Bl.), mangachapuy (*Hopea acuminata* Merr.), mayapis (*Anisoptera* spp.).

Deposits in vessels, etc.—The nature and color of the deposits in the vessels of certain woods is a distinctive character. Thus ipil (*Intsia* spp.) is distinguished by the sulphur-yellow deposits in its vessels; acle (*Pithecolobium acle* (Blco.) Vld.) and catmon (*Dillenia* spp.) by white ones; lumbayao, calantas (*Toona* spp.), and duguan (*Knema* and *Myristica* spp.) by red deposits; ebony, camagon (*Diospyros* spp.), and bolongeta by the very dense, black deposits in all of the wood elements of the heartwood; palo maria (*Calophyllum* spp.), betis (*Illipe betis* (Blco.) Merr.), and bansalaguin (*Mimusops elengi* L.) have pale-yellowish deposits in the vessels.

2. PHYSICAL AND CHEMICAL PROPERTIES OF WOOD.

PHYSICAL PROPERTIES.

Color.—The heart- and the sap-wood are often very widely different in color. Usually, the former is very much darker than the latter and the line of demarcation between the two is often very distinct. In some cases, such as agoho (*Casuarina equisetifolia* Forst.) the heart is only different in degree from the sap, being only a few shades darker in color and showing a gradual change from sap- to heart-wood. In other instances there is no heartwood, the color being the same throughout; examples are dita (*Alstonia scholaris* R. Br.) and lanete (*Wrightia* spp.).

There is usually some range of color within a species, but still not so much as to prevent the recognition of the characteristic color. However, in some species there is the greatest latitude of variability. In narra (*Pterocarpus* spp.), for instance, three colors of wood, respectively known as white, yellow, and red narra, seem to be obtained from the same species.

Color may be due to deposits in vessels, parenchyma and pith-ray cells, or to the presence of some pigment in all the elements of the wood. In calantas (*Toona* spp.), the elements all contain a certain amount of pigment and there is also the red-colored substance in the vessels. The black color of camagon (*Diospyros* spp.), bolongeta (*Diospyros* spp.), and ebony (*Maba buxifolia* Pers. and *Diospyros* spp.) is caused by a compound of tannic acid which fills all the elements of the heartwood.

Odor.—Certain woods are recognizable by their disagreeable odor, as, for example, cupang (*Parkia roxburghii* Don.) and *Eugenia* sp. Calantas (*Toona* spp.) has an odor resembling that of cedar; narra (*Pterocarpus* spp.), a sweetish cedary, and teak (*Tectona grandis* L. f.) a distinctly aromatic odor. Others of our woods have their peculiar odors, which, though fainter and difficult of description, are yet distinctive.

Taste.—A number of our woods may be recognized by their bitter taste; among these are anubing (*Artocarpus* spp.), batino (*Alstonia macrophylla* Wall.), betis (*Illipe betis* (Blco.) Merr.), bansalaguin (*Mimusops elengi* L.), dita (*Alstonia scholaris* R. Br.), and yacal (*Hopea* spp.).

Weight and specific gravity.—We have quite a large number of heavy woods, although perhaps not so large a proportion as is found in some other tropical countries. I have classified our woods as very heavy, heavy, moderately heavy, and light, following the classification used by Gardner.^a We have many woods which when green will sink in water, but the number of these which has a greater specific gravity than water when dry is relatively small. The following table gives a list of Philippine and American commercial woods, with their weight and specific gravity so far as known.

The heavy woods which are italicised frequently come into the "very heavy" class.

Comparative weights of Philippine and American woods.

PHILIPPINE WOODS.

Very heavy. Sp. gr., 0.90 or more. Weight.—Metric system, 900 kilos or more per cu. m.; English system, 56 lbs. or more per cu. ft.; Spanish system, 42 lbs. or more per cu. ft.	Heavy. Sp. gr., 0.70-0.90. Weight.—Metric system, 700-900 kilos per cu. m.; English system, 44-56 lbs. per cu. ft.; Spanish system, 32-42 lbs. per cu. ft.	Moderately heavy. Sp. gr., 0.50-0.70. Weight.—Metric system, 500-700 kilos per cu. m.; English system, 31-44 lbs. per cu. ft.; Spanish system, 22-32 lbs. per cu. ft.	Light. Sp. gr., 0.50 or less. Weight.—Metric system, 500 kilos or less per cu. m.; English system, 31 lbs. or less per cu. ft.; Spanish system, 22 lbs. or less per cu. ft.
Mancono. ^b Duñgon-late. ^c Ebony. Camagon. Bolongeta.	<i>Duñgon.</i> ^b <i>Ipil.</i> ^b Molave. ^b <i>Yacal.</i> ^b Tindalo. ^b <i>Betis.</i> ^b <i>Bansalaguin.</i> ^b Supa. ^b Macaasin. ^b Batitinan. ^b <i>Aranga.</i> ^b <i>Sasalit.</i> ^b <i>Lusin.</i> ^b Tucan-calao. Alupag. Catmon. ^b <i>Agoko.</i> ^b Calamansanay. Mangachapuy. ^b Batete. Lanotan. ^b	Narra. ^b Acle. ^b Teak. ^c Guñjo. ^b Apitong. ^b Amuguls. ^b Palo maria. ^b Banaba. Bancal. ^c Anubing. Tamayuan. Sacat. ^b Malasantol. ^b Balacat. ^b Malugay. ^b Banuyo. ^b Tangulle. ^b Lanete. Duguan. Santol. ^c Nato. Dalinsi. Calumpit. Talisay. ^c Balinhasey. Lumbayao. ^b Batino.	Lauan. ^b Batleulin. Calantas. ^b Mayapis. ^b Red lauan. ^b Dita. ^c Oupang. ^b Teluto. Malapapaya.

^aBur. For. Bull., Manila (1907), 4, 51.

^bThe specific gravity of these woods was obtained from tests made in Manila.

^cThese woods were grouped by data found in Gamble's Manual of Indian Timbers.

Comparative weights of Philippine and American woods—Continued.

AMERICAN WOODS.*

Hickory.	Ash.	White cedar.
White oak.	White elm.	White pine.
Red oak.	Sweet gum.	White spruce.
Peralimmon.	Hard pine.	Bald cypress.
Osage orange.	Cherry.	Red cedar.
Black locust.	Birch.	Hemlock.
Hackberry.	Maple.	Redwood.
Blue beech.	Walnut.	Oregon pine.
	Sour gum.	Basswood.
	Coffee tree.	Chestnut.
	Honey locust.	Butternut.
	Tamarack.	Tulip.
	Douglas spruce.	Catalpa.
	Western hemlock.	Buckeye.
	Soft maple.	Poplar.
	Sycamore.	Willow.
	Sassafras.	
	Mulberry.	

* The classification of American woods was taken from Roth's Bull. Timber, U. S. Bur. of Forestry (1895), 10.

Resonance.—We have no commercial wood in the islands which is suitable for making good sounding boards. Imported coniferous wood is usually used for this purpose in guitars and other stringed instruments of local manufacture, the backs and sides of the instruments being made of lanotan (*Bombycidendron campylosiphon* (Tcz.) F. Vill.), lanca (*Artocarpus integrifolia* L. f.) or other even-grained ornamental woods.

Moisture content, shrinkage, seasoning.—Wood is much heavier when green than when dry, because of the large amount of water which it contains; air-dry it still holds 8 to 10 per cent of moisture and even when it is kiln-dried there is usually some water left in it. It is exceedingly hygroscopic; a piece which has been very thoroughly dried will, if placed in a moist place, take up enough water to equalize its moisture content with that of the surrounding air. This capacity for taking up water is responsible for the swelling and warping of timber. The loss of water from the wood causes shrinkage and where this is uneven, checking.

Seasoning.—The process by which water is gradually removed from wood is known as seasoning. In seasoning, certain chemical and physical changes take place which render the wood stronger, more durable, and usually harder and heavier. The nature of these changes is rather imperfectly understood, but it seems probable that certain materials contained in the pith-ray and wood parenchyma cells become changed into tannins, resins, and other substances which have a preservative and strengthening effect. When properly seasoned a wood is always stronger than it is when unseasoned. There may be several kinds of seasoning, as follows:

Natural seasoning taking place in the tree.—This results in the formation of heartwood by the means already indicated. A loss of water occurs simultaneously with the chemical change taking place, and the deposit of certain substances in the cells more than counterbalances the loss in weight, so that the heartwood is specifically heavier, although lower in moisture content, than the sapwood. This change from sap- to heart-wood is very important in considering the value of a timber. Sapwood seems incapable of equaling heartwood, no matter how carefully it may be handled after leaving the tree.

Artificial seasoning.—In the standing tree: In some cases, as for instance in the teak forests in India, the tree is girdled and then left on the stump for a year or more before being cut. It is claimed that the disadvantages of this method are that the resulting wood is more brittle than it if it seasoned in the usual way, and moreover, during the process it is more exposed to the attacks of burrowing insects. To offset this there is the advantage of rapid seasoning, with but little checking. For some species this is probably the best method.

In the log: Material left to season in the log usually becomes noticeably checked. Rapid seasoning is most safely accomplished in pieces of small dimensions.

By air-drying: The greater part of our material is air-dried—that is, seasoned by standing in piles of lumber exposed to the air. If properly piled, the process will proceed at a fairly rapid rate and the checking will be very slight. The pile should be so arranged that the air can reach the wood from all sides.

By kiln-drying: This is accomplished by means of a controlled supply of artificial heat. Kiln-drying is resorted to whenever it is desired to reduce the percentage of moisture below that of air-dry wood or whenever especially rapid seasoning is required. If the operation is carefully performed, the wood is seasoned with a minimum amount of checking; it is made stronger and is less liable to decay. Of course, kiln-dried wood will take up moisture from the air, but it will not absorb it in as great quantity or as rapidly as the air-dried material; therefore, it actually remains drier than wood which has been seasoned in the air. The best results are obtained by prolonged and careful air-drying, followed by kiln-drying. If properly handled, wood is always improved by being kiln-dried. Unfortunately, the process is not as much practiced with the native woods as it should be.

Seasoning in fluids: Timbers sometimes are submerged in sea water for years before being dried, additional strength and durability apparently being given to them. For many years this has been the process with oak used for ship-building in England. Of course this method of seasoning can only be employed where the material can be so submerged as to be free from teredo attack. Timbers occasionally are encountered which have had a part of their seasoning in fresh water or in the mud at the bottom of fresh-water streams or lakes, an example being the swamp cypress logs which are raised from the mud of rivers and bayous in the southern United States, after having lain there for many years.

Small pieces of woods for certain purposes are *seasoned in oil or other fluids*. All these methods of submerging woods during seasoning have the very great advantage that the process is thereby made a very gradual and uniform one, checking being reduced to a minimum. However, these methods are suited only to special cases.

Heating power.—This varies the content of carbon and contained resins, oils, etc. Our best firewoods are usually those with very thick, dense cell-walls.

CHEMICAL PROPERTIES.

It is not the intention here to treat of the chemical composition of wood or of its behavior under any but the simplest reagents. However, there are a few very simple tests which may aid in the determination of particular woods and these are included here:

Molave (*Vitex* spp.) turns to a bright greenish-yellow when treated with an alkaline solution; narra (*Pterocarpus* spp.) gives a fluorescent, blue color to water; betis (*Illipe betis* (Blco.) Merr.) or bansalaguin (*Mimusops elengi* L.) will form a lather if the surface of the wood be rubbed with water or saliva; calumpit (*Terminalia edulis* Blco.), dalinsi (*T. pellucida* Presl.), sacat (*T. nitens* Presl.), or talisay (*T. catappa* L.) will color water a dirty, straw-yellow; catmon (*Dillenia* spp.) causes water to become pale red.

Others of our woods will doubtless also be found to give distinct reactions with simple reagents.*

3. DURABILITY AND DECAY.

Fungi and bacteria.—These grow abundantly in warm and moist situations. Wood which is partly submerged, or in contact with the ground, is most subject to the attack of these organisms, a continual supply of moisture favoring their development. Piling, railroad ties, and portions of buildings in contact with the ground give the best illustrations of destruction by these means, but while wood is always liable to damage from these causes, they are not the most serious considerations in this climate.

Beetles.—Woods frequently are encountered which are completely riddled by the burrows of wood-boring beetles; these extend in all directions and very perceptibly weaken the wood. The presence of beetles is indicated by the open burrows or by fine wood dust pushed out from them. It is said that no woods are entirely immune from beetle attack. In the very hard woods, however, it is usually only the sapwood which is affected. Logs left in the forest or piled with beetle-eaten material are most subject to attack. Certain woods, such as

* A discussion of the mechanical properties of wood is given in Timber, Bull. 10, U. S. Bur. For., and for a discussion of the mechanical properties of Philippine woods the reader is referred to Gardner, Bull. For. Bur., Manila (1906), 4, (1907), 2d edition.

dita (*Alstonia scholaris* R. Br.) and lanete (*Wrightia* spp.), are particularly liable to be damaged in this way. No entirely satisfactory means of preventing beetle attacks has as yet been found.

Any or "white ants."—Termites, very generally known in the Islands as *any*, destroy a great many of the softer woods, completely hollowing them out until only a shell is left.

Shipworm or teredo.—This is the most serious enemy to piling, boat keels, and other wooden articles which are immersed in sea water. The work of these small animals constitutes so serious a nuisance as to render any but a very few of our very hard woods useless for piling.

IMMUNITY, FROM ATTACK.

Hardness.—A few woods, such as mancono (*Xanthostemon verdugonianus* Naves) for piling and molave (*Vitex* spp.) for house construction, seem to be immune from attack because of their hardness. As a rule the hardwoods are very much freer from insect and teredo attack than are the soft kinds.

Taste and odor.—It seems probable that some woods may be safe from insects because of a taste or odor which is not agreeable to the invaders. This is supposed to be the case with calantas (*Toona* spp.).

IMPREGNATION AND OTHER ARTIFICIAL MEANS OF DEFENSE AGAINST INSECTS AND TEREDO.

Creosoting.—Creosoting, in the very few cases in which it has been tried in the Islands, has been very satisfactory, but it can not as yet come into common use because of the present prohibitive cost of creosote in Manila.

Impregnation with mineral salts may prove effective, if some way can be found of precipitating the salts in the wood so that they will not leech out under the action of this moist climate.

Painting a wood has proved effective so long as the painted surface does not become cracked.

There is further need of experiment to determine what Philippine woods are most immune to insect and teredo attack, and what are the best artificial means of defense.

USES OF PHILIPPINE WOODS.

While complete tests have not been carried out for any Philippine woods, certain of them have been found to be particularly well fitted for especial uses, and the effort is here made to group the woods of commerce according to their use.

1. *In places exposed to salt water and teredo attack.*—For piling: Iusin, betis, aranga, mancono, banaba, battinan, bolongeta, duñgon, duñgon-late, mangachapuy, molave, and yacal are used; but the first four mentioned give the best satisfaction.

In addition to these there is agoho, which by its great hardness and its normal, tapering shape seems to be well fitted for piling. It seems not yet to have been tried for that purpose.

For ship and boat building: Teak, usually of the first importance as a ship-building wood, is of small importance in the Philippines because of its very restricted occurrence. It is obtainable only in small quantities.

For keels and other parts of ships exposed to salt water: Aranga, banaba, bansalaguin, betis, duñgon, guijo, Iusin, molave, narra, palo maria, and yacal are used.

For small boats, bancas, cascoes, etc., a large number of different woods are employed, among which are: Apitong, amugula, bancal, banuyo, calantas, white lauan, lumbayao, malasantol, malugay, mangachapuy, and tangulle.

2. *In places where the wood is in contact with the ground.*—For corner posts of houses (*harigues*): Molave, ipil, acle, agoho, alupag, anubing, aranga, banaba, bansalaguin, banuyo, battinan, betis, calamansanay, duñgon, duñgon-late, Iusin, macaasin, mancono, mangachapuy, narra, palo maria, sasalit, supa, tamayuan, tucan-calao, yacal.

For railroad ties: Molave, ipil, acle, betis, aranga, duñgon, yacal, tindalo, sasalit, supa, anubing, banaba, bolongeta, agoho. In addition to these, the following have been recommended by the Forestry Bureau as worth testing: Toog, dao (*Dracontomelum* sp.), apitong, amugula, banuyo, malaruhut (*Engenia* sp.), palo maria.

For paving blocks: Molave is the only native wood which is known to be satisfactory as a paving block. Several of the woods used for railroad ties should be tried for this purpose.

3. *For use as construction timbers.*—For heavy framing and general high-grade construction: Acle, agoho, alupag, aranga, banaba, bansalaguin, batitinan, betis, catmon, dufigon, dufigon-late, ipil, liusin, macaasin, mangachapuy, molave, narra, palo maria, sasalit, supa, tamayuan, tucan-calao, yacal.

For medium-grade construction: Annubing, lumbayao, guiyo, malasantol, malugay, lanotan, calamansanay, banuyo, batete, apitong, amuguis, tangulle.

For light or temporary construction: Balacat, balinhasay, bancal, batino, calantas, calumpit, cupang, duguan, dalinsi, dita, lanete, white lauan, red lauan, malapapaya, mayapis, nato, sacat, santol, talisay.

4. *For use in making furniture and ornaments.*—For the better grades of furniture there are used: Tindalo, acle, palo maria, catmon, teak, supa, ipil, narra, calamansanay, banuyo.

Cheap furniture is made of guiyo, bancal, apitong, calumpit, dalinsi, sacat, talisay, dita, santol, baticulin, batete, malugay. Tangulle, red and white lauan, apitong and lumbayao make cheap furniture of excellent quality.

Besides the above-mentioned woods the following are used in cabinet making: Anubing, aranga, banaba, bansalaguin, camagon, bolongeta, ebony, lanete, lanotan, macaasin, tucan-calao, yacal, narra. Lanete, molave, and santol are among the woods used for wood carving.

**COMPILATION OF NOTES AND REPORTS ON
THE CONDITION OF AGRICULTURE IN
THE PHILIPPINE ISLANDS.**

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COMPILATION OF NOTES AND REPORTS ON THE CONDITION OF AGRICULTURE IN THE PHILIP- PINE ISLANDS.

GENERAL CONDITIONS.

[From report of the Schurman Philippine Commission, 1900, vol. 4, p. 5.]

STATE OF AGRICULTURE.

Introduction.

GENERAL ASPECT.

Agriculture, the chief source of wealth and prosperity, the inseparable companion of the well-being of families and of the power of States, this branch of production, most intimately allied with the lot of the people, has not prospered in the Philippines as was to be expected, in view of the favoring conditions which exist in the soil and vegetation of the virgin land, which assist in the solution of such a great problem. In effect, the insular tropical climate of the Philippine Archipelago, with the various modifications of it caused by the topographical situation—the humid atmosphere on the one hand, and the diversity of soils due to mineral constituents and effluvial matter on the other hand, and finally the great wooded regions which have deposited upon the land during ages a thick coating of organic matter, a most desirable fertilizer of the soil—all this constitutes a union of conditions which make the Philippine land able to produce and multiply not only the productions of tropical climates, but also many others of temperate zones, if proper measures are taken.

For what reason is it, then, that the actual conditions do not correspond to such dispositions? The poorly developed agricultural condition is due to several causes. We will enumerate briefly the principal ones in the first of the three following chapters into which this part is divided. In the second chapter we will indicate the actual present condition of Philippine agriculture, and finally, in the third, we will consider certain means of improvement.

Causes of the slight development in agriculture in the Philippines.

SMALL POPULATION.

One of the first requisites for the cultivation of land, without which it is not possible to develop the soil in a rational manner, is the hand of man, and human labor must stand in harmony with all the other agents of production. The worthy cultivation of the soil is not possible if there is a lack of hands for the multifarious labors. This condition has existed in the Philippines. There has existed no proper proportion between its scanty population and the immense area of its territory. In 1810, by approximate computation, there existed in the archipelago 2,526,000 inhabitants. Among them were, Chinese mestizos,

119,000; Chinamen, 7,000, and those of the white race did not exceed 4,000. As a matter of fact, but one-ninth part of the whole territory—3,267,000 hectares—was cultivated. Bearing in mind that the extent of Philippine territory is nearly equal to that of Italy, with 28,000,000 inhabitants; a little less than that of England and Ireland, with 32,000,000 inhabitants, and six times that of Belgium, with 5,000,000 inhabitants, the condition of the Philippines is conspicuous, presenting a virgin soil and an extensive territory to a population of scarcely 8,000,000.

SLIGHT ACTIVITY OF THE NATIVE RACE.

If, in connection with the scanty population, is taken into consideration the character of the Indian, it will be seen that the proverbial laziness of the native race has been no slight obstacle to advancement in agriculture, as in other directions. Content, as they are, with the most limited amount for sustenance, which, as a rule, they are able to gain without effort, they do not apply themselves to work and have none of the more lofty ambitions. They care naught for the morrow nor for leaving to their children and their heirs the means for enjoying a happy future. While there are honorable and frequent exceptions, increasing in number every day, it is none the less a fact that in general they refuse to eat bread won by the sweat of the brow, and this in spite of the fact that it is to agriculture the Filipino owes all there is of value in the general traffic of the islands; for, without taking into account the large interisland traffic and consumption of prime agricultural products, 90 per cent of its exportation, which exceeds 36,000,000 pesos annually, is composed of a few leading products of the soil upon which but little handwork is spent, even in the case of manufactured tobacco. Indeed, up to the present time there exists no considerable branch of exportation which does not come from the vegetable kingdom, obtained in the first instance by field labor.

THE LACK OF WAYS OF COMMUNICATION.

No one is ignorant of the great advantages which means of communication afford to agriculture. It is indeed one of the chief conditions for the development of agriculture if there is any pretense of seeking rich results from it. Unfortunately, in the Philippines there are scarcely known other ways than the so-called general highways, and these in certain periods of the year are little less than impassable. Nor are there byways or anything deserving this name in the great majority of districts. Such byways, or secondary roads, are essential means of communication in agricultural districts; and for the farmer it is a necessity to be able to transport, without the destruction of his beasts of burden, the products of his lands to the markets where they will find best sale. Because of the lack of such ways of communication it results that the districts produce only that required for their own subsistence, leaving stationary the general march of agriculture and abandoning the elements of production which natural opportunity provides in a country naturally as fertile as the Philippines.

FAILURE TO TAKE ADVANTAGE OF THE WATER OF RIVERS.

A multitude of rivers, large and small, pass through the lands of the archipelago. They run along their great beds without, however, inundating their boundaries and fertilizing the country. With very slight cost, however, in many places they can be diverted and run into small canals, irrigating extensive tracts, which at the mouths of these rivers stand awaiting this kind of fertilization, thus transforming barren plains into beautiful and productive fields, in which can be raised a great number of plants that will greatly augment the wealth of the country. Many districts now lose crops and suffer hunger in consequence of drought because trusting solely to the water of rains, while having, nevertheless, in the neighborhood rivers which easily would furnish not only water for irrigation, but also fertilizing matter which they always hold in greater or less quantities. To a still less extent has the country taken advantage of the great power of flowing water as a motive force for the simple machinery used in production. In many rivers there are falls of water which, in addition to serving as irrigation for the district, could, with small cost, be turned to remunerative industrial development.

IMPERFECTION OF AGRICULTURAL IMPLEMENTS.

The poor state of production in which the archipelago stands with relation to other countries depends further upon the deplorable systems of cultivation followed by its farmers. In the Philippines there is scarcely known, much less employed, a single one of the thousand well-perfected agricultural machines, the use of which in other countries is general, even among agriculturists least skillful. By reason of this all work is done in an imperfect manner, because in no other manner can work be done with the antiquated implements which are here used.

LACK OF CAPITAL.

The lack of proper capital and the high price asked for loans constitute another obstacle, which stupefies industry, augments the cost of production, and restrains, in consequence, its benefits. In order to till the soil capital is necessary, if not indispensable, and often can be reimbursed only at the end of years.

HAPHAZARD METHODS.

Vicious also is the general system of agriculture adopted and followed in this country. It neither suits the necessities of its inhabitants, much less nourishes and furthers commerce and industry, nor does it take proper advantage of the happy combination of soil, climate, and good distribution of waters which are at hand. The unenlightened method of cultivation of the fields employed is purely brutal; it being recognized that to till the soil, with proper fruit, there is more need of work with the head than with the hands. In a word, there is in the archipelago no system of agriculture, properly so called, and the greater part of the people have no idea of what agriculture really means. In a land like the Philippines, in which in every direction there grow spontaneously plants of commercial and industrial value, and of the best quality, how easy it would be to subject them to a cultivation which would greatly improve and proportion the products to a greater number of industries, which would give occupation to many hands in addition to those directly employed in agriculture. By the side of the agricultural population there would then grow up an industrial population which could make use of the products of the soil and in turn be a consuming class.

CONSEQUENCES.

To the defects enumerated is to be attributed the fact that the Philippines so long remain in the primitive agricultural condition in which, according to economists, the country produces only that which is strictly necessary for its own meager sustenance. The defects spoken of in the agricultural system lasted down to the time of Governor-General Basco, who, in 1782, decreed in certain provinces a monopoly and an enforced cultivation of tobacco, inaugurating by this scarcely equitable measure the agricultural progress of the country.

FUTILE EFFORTS OF THE ROYAL COMPANY OF THE PHILIPPINES.

Coincident with the decree above mentioned was established the Royal Company of the Philippines, with a large capital raised in Spain. Its principal object was to establish upon a large scale proper mercantile relations between the archipelago, East India, China, and the Spanish-American colonies. The business with the last-named countries consumed, however, a great amount of the capital and the greater part of the activities in the development of the agriculture of the archipelago. To this is due the attempts made to develop on a large scale the cultivation of cotton, pigments, cloves, cinnamon, coffee, cocoa, and the mulberry tree for the growing of the silkworm, and other products of the soil. But the general apathy that came, the lack of technical knowledge on the part of subordinates, the privileges granted to shippers from Acapulco in hostility to those of the company, and, lastly, the strange privileges in business, amounting to a tacit, if not expressed, monopoly, conceded to the provincial governors, which lasted down to the year 1844, together with other causes, such as general backwardness and ignorance and the mercantile isolation of the country from other countries, were eventually the powerful means to nullify the high and patriotic projects of this company, causing its downfall, not, however, without leaving the seed of notable agricultural experiments, which later bore valuable fruit.

STATISTICAL FACTS.

A few statistical facts will aid in the comprehension of the slight importance of Philippine agriculture in the first years of the present century. In the beginning of this century, the exterior commerce—exportation—of the archipelago amounted only to some 4,795,000 pesos, of which 2,800,000 was the export of coined silver, sent for the purchase of silk and cotton goods and other products in China and Hindostan. One million seven hundred and forty thousand pesos more were sent to America, leaving only some 500,000 pesos to represent the export of Philippine products, properly so called, such as rice, ebony, aneal, sugar, cotton, shell, birds' nests, horns, etc. So that it may be said that at the beginning of the century the total exportation of agricultural products of the Philippines scarcely amounted to 400,000 pesos annually.

Present state of agriculture in the islands.

In spite of the conditions which we have just noted, and due to the popularization of scientific theories and the stimulus which generally has been lavished upon agricultural industry, and the admirable development which every class of industry has received in other countries, there is beginning to be reflected the beneficent influence in the Philippine territory, and the stimulus produces excellent results. Science likewise lends its aid in agricultural undertakings, bringing practical ideas to the mind of the cultivator and arousing him from his old routine.

MODEL AGRICULTURAL BUILDINGS AND STATIONS.

In addition to the meteorological observatory of Manila, whose services to navigation, commerce, and agriculture are well known to all, various royal decrees have been passed relative to the development of agriculture in the Philippines. We here note the most important.

By royal decree of the 8th of July, in the year 1884, it was decreed that in the future the agricultural department should be independent of the inspection general of state lands and should remain in charge of an agricultural commission, whose organization, object, functions, and duties were determined in regulations approved by the sovereign. By these regulations there were intrusted to the commission the following duties: First, study of agriculture, animal production, and the means leading to their improvement; second, theoretical and practical teaching of agriculture and animal culture and its derivatives; third, preparation of statistical and descriptive documents with regard to said productions; fourth, building of edifices devoted to agricultural teaching; fifth, editing of monographs with reference to agriculture in the archipelago and with reference to industries created; sixth, zoological studies; seventh, the making of agricultural collections, properly classified, to be sent to the minister of ultramar, and local museums to be created.

By royal decree of the 26th of November, 1887, there was ordered the creation in Manila of a school of agriculture whose object was the theoretical and practical education of skilled farmers, the education of overseers, and the promotion of agricultural development in the Philippines by means of observation, experiment, and investigation. In virtue of these royal acts the School of Agriculture in Manila was opened on the 2d of July, 1889. There are, in addition, two courses in agriculture given; one in the University of Manila, and another in the Ateneo Municipal. There exist two model farms in the provinces of Pampanga and Visaya, and five agricultural stations in the islands, which are at the same time schools for overseers.

The technical work intrusted to the agricultural stations mentioned is the following: First, the determination and study of the physical properties of the tillable soils of the region; second, mechanical analysis of the same; third, physical-chemical analysis of the same; fourth, qualitative analysis of the same; fifth, analyses and experiments by the scholars, and their employment in actual practice; sixth, study of systems of irrigation, quantity and quality of water, epochs and times of irrigation best adapted to cultivation; seventh, analysis and study of seeds, methods of sowing and grafting; eighth, study and analysis of secondary products of agricultural products and their uses; ninth, experiments with classes of labor, and with machines and instruments best adapted to cultivation; tenth, experiments with new kinds of products, and studies of their adaptability and cultivation; eleventh, study of the climate

and its action upon products, of the natural fertility of the soil, the assimilation of atmospheric and other elements, and the manner of changing them; twelfth, study of the expense and products of actual cultivation and of reforms in the economy of production; thirteenth, studies with reference to herds and their races, qualities, feeding, care, and the acclimatization of new species and breeds; fourteenth, study of agricultural industry, industrial products, machinery, and reforms in industrial methods; fifteenth, study of the diseases or pests affecting crops and animals and the means of combating them and conserving products; sixteenth, solution of all other problems of technical or economical character which affect, or may affect, the agriculture of the region.

The chief of this service, the professors of the school, and the directors of the farms and farming stations are required to be agricultural engineers, with skilled, graduated farmers for assistants.

In the year 1887 a beginning was made of this work on the model farm of the Visayan, established in the town of La Carlota (situated in the island and province of Negros), longitude 123° east of Greenwich, latitude $10\frac{1}{2}^{\circ}$ north; height above the sea, 125 meters. It was established near the principal centers of cultivation of the archipelago. Its results have been recorded in a special publication.

The model farm of Luzon was established in the town of San Pedro de Magalang. It was situated in the province of Pampanga, longitude $120\frac{1}{2}^{\circ}$ east of Greenwich and latitude $15\frac{1}{2}^{\circ}$ north; height above the sea, 33 meters. On this farm there has been organized since 1888 a fold for the raising of horses of Arab breed for crossing with the horses of the island.

The five agricultural stations heretofore mentioned are as follows: First, that of Albay, in the province of the same name. It is situated in the south-east of Luzon $123\frac{1}{2}^{\circ}$ east of Greenwich, $13^{\circ} 09'$ north latitude; height above the sea, $10\frac{1}{2}$ meters. Second, that of Isabela Luzon, in the province of the same name, in the north of Luzon, $127\frac{1}{2}^{\circ}$ east of Greenwich, $17^{\circ} 38'$ north latitude; height, 42 meters above the sea. Third, that of Iloilo, in the district of the same name, in the island of Panay, $122\frac{1}{2}^{\circ}$ east of Greenwich, $10^{\circ} 41'$ north latitude; height, 8 meters above the sea. Fourth, that of Ilocos Sur, in the province of the same name, in the north of Luzon, $120\frac{1}{2}^{\circ}$ east of Greenwich, $17\frac{1}{2}^{\circ}$ north latitude; height, 15 meters above the sea. Fifth, that of Cebu, in the island of the same name, $123\frac{1}{2}^{\circ}$ east of Greenwich, $10\frac{1}{2}^{\circ}$ north latitude; height, 25 meters above the sea.

By decree of the general government of the islands, on the 22d of July, 1892, there was ordered the publication of a periodical, entitled Official Agricultural Bulletin of the Philippines, in which there should be published all the data relative to the work accomplished in the agricultural establishments mentioned; and by another decree, by the same authority, on the 3d of November, 1893, it was ordered that this periodical should begin to be published from the 1st of January, 1894. It began publication from the 1st of January, 1894, the chief of the agricultural service of the Philippines being director thereof, and the engineers and their assistants being the editors.

AGRICULTURE AND ANIMAL CULTURE.

Certain animals are intimately allied with agricultural production. They are so allied because without them agriculture could not easily progress, and because a certain number of the inhabitants must give them attention, and because they produce without much cost various articles for the laborer, and finally, because there are plants and products distinctly and only for their maintenance. Accordingly, after having set forth the principal vegetable products of the archipelago, we will speak briefly of herds and other domestic animals connected with agriculture.

PRINCIPAL VEGETABLE PRODUCTS OF THE ARCHIPELAGO.

In order to appreciate the actual agricultural condition of a country or region with respect to its products, it is sufficient to consider the most important. Although in the treatise on phytography it is set forth what are the principal crops of greater cultivation in the islands, nevertheless we will briefly enumerate them here, with some remarks.

Rice is the bread and principal sustenance of the natives. The land responds with wonderful fertility to the labor which the native puts upon it, rendering in good years from ninety to one hundred times the amount of rice sown. There

exist more than 120 varieties of this grain, distinguished by color, size, taste, and adaptability. The ordinary price of rice, with its hull, called palay, at its place of production and in normal times, ranges from 6 to 7 reales fuertes per cavan (16 liters). The price of rice cleaned or hulled ranges from 15 to 16 reales per cavan.

The annual production of palay in the Philippines is some 17,000,000 cavans, but even this, united with maize, mangoes, and other food plants, does not suffice for the internal consumption, it being necessary to import from Saigon annually more than 1,000,000 cavans, of the value of 2,500,000 pesos on the average.

In certain Philippine provinces corn takes the place of rice as the staple article of food. Such is the case in Cagayan and Isabela de Luzon, where the cultivation of this product is alternated with that of tobacco.

Abaca (manila hemp plant).—Hemp occupies the chief place among fibrous and textile plants. Its enormous production has been limited to certain regions of the Philippine Archipelago, as all the attempts made to introduce its cultivation and utilization in Borneo, Sumatra, and other points have failed. It constitutes one-third of the Philippine exports, it having been remarked, according to statistics published in 1894, that from the year 1818 to the year 1894 the production and exportation of raw hemp has increased from the insignificant quantity of 13,883 kilograms exported in said year 1818 to that of 93,741,824 exported in 1893 and valued at 12,558,548 pesos, according to official custom-house statistics.

Cotton.—Some time ago cotton attained some importance in the Philippines, because it was the principal material of the domestic weaving industry, now reduced to very limited proportions on account of the competition of English and Spanish cotton cloths, which are imported to the amount of 5,000,000 pesos, and of the tax on looms.

"We have not the slightest doubt," says Dr. San Martin, who has written a valuable little book on the cultivation of cotton in the Philippines, "that with a good choice of lands, with the adoption of seed the best adapted to the quantity and quality of the cotton harvested, and principally with the use of American cotton-working machines, either worked by hand or by any kind of motor, and without omitting anything essential, the greatest success would crown the work undertaken by cotton raisers. The sale of the product on favorable terms would be sure in Manila itself, where the certainty of having good cotton in abundance would probably lead to the immediate establishment of spinning factories, and possibly of weaving factories also. Now that sugar is in a miserable state at present and has a future precarious and sad enough, it would be well for agriculturists and merchants to think of the great advisability of establishing cotton plantations. * * * An annual importation of more than \$800,000 in cotton threads and of \$7,000,000 to \$8,000,000 in cotton goods we believe offers a broad field for competition to a Philippine agricultural and manufactured product of this most valuable textile material."

Sugar.—For a long period this was the chief article of export and one of the principal Philippine products. Afterwards the demand for the production of hemp grew in importance until it was placed at the head of our exportations, while, with rare turns of rising, the demand for Philippine sugar diminished. In the period from 1889 to 1893 the average sugar exportation amounted to about 11,500,000 pesos.

Three enemies as cruel as persistent mainly conspire to kill the exportation of Philippine sugar, and they are: Beet-root sugar, high freights, and the bad curing of sugar.

The very impure Philippine sugars contain great quantities of dregs and of vegetable acids already in a state of fermentation; which occasions a great loss of crystallizable saccharine substances in the refineries.

Tobacco.—Philippine tobacco represents now substantial wealth and a flattering future, because the tobacco business rests upon a solid basis, which is the excellence of the leaf, only excelled in the whole world by the justly celebrated Havana tobacco. For the present, limiting ourselves to the prepared leaf, or leaf tobacco, we shall say that from 552,000 pesos' worth exported in 1884, the exportation during the past five years has risen to about 2,000,000 pesos, without counting the value of manufactured tobacco, which is considerable.

These figures and this gradual increase observed in the exportation of our tobacco in the midst of the general crisis through which almost all the producing countries have been passing, overwhelmed with stocks larger than the demands of universal consumption, offer a legitimate and very pleasing outlook

for the Philippines, because they clearly demonstrate that the only reason for this increasing demand for our tobacco is its marked superiority.

Indigo.—For many years Philippine indigo, especially that of Laguna and of Ilocos, was the worthy rival of that from Guatemala, which is considered the best in the world. But on the one hand the deceptions practiced blindly and avariciously by the Chinese traders, in whose hands this valuable trade had been, and which was discredited in consequence, and on the other hand the application to dyeing of aniline dyes extracted from coal tar, very cheap and with magnificent colors, although not very permanent, were potent reasons for diminishing to a great extent the demand for Philippine indigo.

In 1893 107,000 kilograms of solid indigo, valued at 85,000 pesos, were exported, and of liquid indigo 276,000 kilograms, valued at 13,500 pesos.

Cocoa.—Cocoa is a delicate plant, and although it is found in small quantities in several provinces of Luzon and Visayas, where it prospers best is in southern Mindanao and in the district of Davao, where it is produced in greater abundance and of better quality. The production is limited and is estimated to be some 2,000 piculs, which are consumed in the archipelago. The first cocoa plants in the archipelago are due to Father Juan de Ávila, of the Society of Jesus, for he used his influence with the Governor Don Diego de Salcedo to get from New Spain some living plants of cocoa, which he planted and cultivated with the greatest care in Ilog, capital of the island of Negros, where he then lived. (P. Delgado, S. J.)

Coffee.—Coffee was until a short time ago a very widely distributed product, which was found in the provinces of Laguna, Tayabas, Cavite, and especially in Batangas, which was the chief center of its production. Philippine coffee may be compared to that of Java and Martinique, but there are some localities where, according to experts, it is produced equal to that of Mocha. The statistics of the years 1887 and 1888 give a production of coffee in all the islands of 115,000 piculs, some 100,000, valued at ₱2,000,000, being exported, half of this exportation going to Spain and the rest to China, British India, and Japan.

In order that Philippine coffee may compete in the markets of the world with similar American products it only lacks perfection in shelling and polishing, which deficiencies can be easily remedied by apparatus suitable for correcting those defects.

For some time past the production of coffee has been diminishing to such a degree that during the year 1893 only 374 piculs of this valuable article were exported. The cause of this decadence is the destruction caused in the plants by an insect of the genus *Xylotrechus*, and by a fungus of the genus *Peronospera*.

Cocoa palm.—This is a tree of inestimable value, because everything can be used, as we have said, in the proper place. It abounds in all the archipelago, and its fruit, the cocoanut, is exported to France, Spain, England, and China to the value of \$675,432; and the oil only to China to the value of \$15,445. It is generally exported in the form of copra.

STOCK RAISING.

In view of the vast plains which could be used for grazing, the herding industry leaves much to be desired in the archipelago.

Horses.—Most of the horses in the Philippines came from Mexico, Spain, and China. They are small and have hard hoofs, as mentioned in the zoography. The Indian does not take the care of them that such noble animals deserve; they make them work before they are full grown and overwork them in their races. The provinces which have the best horses are Batangas and Pangasinan. They are plentiful, but more delicate, although better adapted to racing, in Ambos Camarines, Albay, and Sorsogon. Those of Ilocos are small, but strong. In Visayas the Mindoro horses are renowned, and they abound in Negros, Cebu, Iloilo, and Leyte. The horses of Mindanao and Jolo are very good and of good height, but rather wild; they are quite abundant in the districts of Misamis and Cotabato.

Buffaloes.—These cattle are represented by the carabao or buffalo (*Bubalus buffelus* L.) of the bovine family. It is the most remarkable quadruped which the Spaniards found in the Philippines. There are few animals so ugly, but few more useful for agricultural purposes, especially in the Philippines, where it could not be replaced. It is black, or dark brown, its coat of hair being very streaked, its horns large, curved, wide, and rough; the head small in comparison

to the large body. It has great strength in drawing heavy burdens, but its gait is slow and its movements sluggish. On account of its great resistance to the heat of the climate and the great ease with which it fords large rivers and works the marshy lands, in which all parts of the archipelago are converted during the rainy season, it is invaluable. The buffalo is also indispensable in the Philippines, because without it it would be impossible to travel through many regions, especially in the rainy season. It begins to work when 4 or 5 years old, and lives until 30, and its horns and hide are very useful. The buffalo is uniparous, has an ugly appearance, a good scent, and excellent hearing. It eats much and needs to drink often. It is supposed that there are a million and a half head of these cattle.

This animal is the most abundant and the best developed in the country; it is almost the only animal used in agricultural work, and as a beast of burden. The provinces where most are bred are Pangasinan, Pampanga, Albay, Laguna, Morong, and Zambales, in Luzon. In Cebu, Iloilo and Negros, in Visayas, and in Mindanao, in the districts of Misamis and Cotabato.

The wild mountain buffalo in a savage state is to be feared. Meeting with it in the forests is really dangerous for men.

Neat cattle.—This species does not belong to the Philippines, but came from Mexico and China, and is not as useful as in other countries. Ordinarily it is only raised for beef. In some provinces they are beginning to use oxen for field work and as draft animals.

The best neat cattle and the most abundant are found in the province of Batangas, where they substitute the buffalo in a great measure for field work. They are also plentiful in Mindoro, Masbate, and Ticao, from which islands the dealers of Manila are supplied. There are also good cattle ranches in the island of Tabliran, northern Luzon, in Calamianes, and Benguet. In Visayas neat cattle abound in Negros, Cebu, and Iloilo, and in Mindanao, in the districts of Misamis and Cotabato.

Sheep.—These animals do not prosper in this archipelago, and there are very few and miserable specimens of this most important kind of cattle.

Goats.—These are bred to a certain extent, especially in the mountains. The provinces where there are most are Batangas, in Luzon, in Visayas, Cebu, Iloilo, and Leyte, and in Mindanao, in the district of Misamis.

Pigs.—These are more abundant and of more utility in the Philippines than the two previous classes. The Philippine swine are of Chinese breed. Their principal use is that of the breed, that is to say, for making lard. In small towns, and even on the outskirts of large ones, almost all the inhabitants raise pigs. The provinces where there are most are in Luzon, Batangas, and Pampanga, in Visayas, Cebu, Iloilo, and Samar, and in Mindanao, Misamis, Cotabato, and Zamboanga.

Domestic fowl.—Chickens abound throughout the archipelago, but they are only raised on a small scale, and there are no special breeds which merit particular mention. Turkeys are also raised, but in the same way as chickens.

Ducks.—The ducks raised in the town of Pateros (near Manila), where all the inhabitants are engaged in this industry, deserve special mention. The breeding places are located on the banks of the Pasig River, in the form of yards fenced with bamboo cane about 1 yard higher than the level of the water, where the adult ducks pass the day. Near this there is another inclosure where there is less water, where they keep the medium-sized ducks or those beginning to have feathers. Behind these two inclosures there is another smaller one with a floor of woven cane or sanall, where the little or newly hatched ducks are kept.

The food of the little ducks consists of boiled rice, or morisqueta, and small crabs. The larger ones are given palay, or rice in the husk, and a small snail, called by the natives *susó*, which comes from Laguna de Bay.

In the duck houses, which are not far distant from the duck yards, there is the same separation. At sunset all the ducks retire in an orderly manner to their respective departments, to return to the yards at daybreak on the following day in the same order. It is hardly daylight when the bantay, or keeper, opens the doors. In the duck house there is a floor of rice husks 10 centimeters thick and a light burning all night. After the ducks are let out in the morning and fed their usual ration, the keepers gather the eggs laid by the ducks into little heaps of from five to ten. Those collected are taken to the general storehouse until the number necessary for one setting is collected.

Near the house of the proprietor, not far from the duck houses and duck yards, there is a house or room of bamboo and palm leaves, carefully built, and

with as few apertures as possible—sometimes only that of the door of entrance. The interior walls are of bamboo or woven cane, and the floor is a thick layer of rice husks or ipa. Around the walls at the distance of a meter a sort of barrier is raised with woven cane (matting), and between this and the wall some baskets, called toangs, are placed to receive the eggs for hatching. The space between the wall and the barrier is filled with rice husks for the purpose of isolating the interior temperature of the baskets from that of the outside room.

At the entrance door of the room there is an iron boiler, wherein the rice husks, contained until then in bags of hemp cloth, are heated. When the husks are heated they are replaced in the same bags, near the baskets, or toangs, where are already prepared 1,000 eggs in the same number of bags as those containing husks, usually eight. A bag containing husks is then placed at the bottom of the basket without emptying it, and above it one of eggs, and so on in layers. The temperature is kept 36° to 37° C., and in order to do it the operation of heating the husks and returning them to the baskets is repeated every day, taking care to place in the bottom layers those eggs which were the day before in the top layers. After twenty-one days the eggs are taken out and put on tables in the center of the room. On each table 1,000 eggs are placed, arranged so that they touch each other, and covered with blue cotton cloths to protect them from the light and somewhat from the temperature of the room. The eggs have a temperature of 32° C., approximately, and are kept at this temperature for eight days, when the little ducks begin to hatch out everywhere. At this time the keeper, who during incubation sleeps alongside of the same table, gathers up the little ducks one by one and puts them in a broad basket of reeds or bilao, with straw, under the table, where they all perspire and dry off for one or two days. Thence they are taken to the small duck yard already mentioned. When they are grown the male ducks are taken to market, the females being kept for breeding purposes.

Means for the successful development of agriculture.

NECESSARY KNOWLEDGE.

Agricultural production is a vast problem, susceptible to an infinite variety of combinations and solutions, and in which a considerable number of elements, not only differing from each other, but variable, by reason of a multitude of accidental and unforeseen circumstances, and which it is frequently difficult to appreciate and discern, enter, so that what is true for one locality is not true for another, what is good in this district and beneficial is prejudicial in another, what can be used with profit on one farm may possibly be ruinous on another neighboring one, what has turned out well one year may be a failure in the following, and, finally, what may give a profit at one time may by reason of this or that circumstance soon fail to give it.

In this state of things it is readily seen that it is impossible to take into account the infinitely changeable influences which in greater or less degree are involved in the phenomenon of agricultural production, both from the point of view of the laws of nature as well as from the standpoint of the mechanical and economical means to which it is subject at the will of man.

In order to properly work a farm to get out of it the crops it should produce, it is not enough to have a theoretical and practical knowledge of agriculture, it is necessary to add to it exact notions of the following points:

- (1) The best system of cultivation to follow, according to the nature of the land, its location, and all the circumstances which may influence the growth of the products.
- (2) The preference which should be given to certain crops which yield the most profit and which are best adapted to the nature of the land cultivated.
- (3) The most economical methods of obtaining the greatest possible amount of crops.
- (4) Finally, the best means of utilizing these products and getting from them the greatest net profit.

PROTECTION ON THE PART OF THE GOVERNMENT.

One of the duties most proper to a government and of great responsibility is the encouragement and protection it owes to agriculture, because from perfecting the same and the development of the arts necessary for the utilization of

its products the welfare of a people is derived, a well-being which it is especially incumbent upon a government to promote. The Filipinos, with the elements contained in their soil, will be able when the time comes to devote themselves with much profit to all kinds of industries; but in order that these industries may have rational conditions of life and prosperity the first thing to do is to give the Philippines, by means of a good system of cultivation, agricultural industries.

By system of cultivation is understood the diverse processes which are employed for working arable land, harmonizing the forces of nature which work all the time and by themselves and those which, depending on man, he may use and direct as he pleases. According to this there must be many systems of cultivation, because there are many different ways of obtaining products from the soil. Left to itself, and therefore limited to the forces of nature, the earth becomes covered with wild vegetation destined, according to the quality and situation of the lands, to form meadows or forests, which in a certain way may be made to alternate with products obtained by the work of cultivation. The choice of a system of cultivation is one of the things which should most attract the attention of the agriculturist. To determine, with probabilities of certainty what may be the system of cultivation best suited to a farm there is necessary (1) exact knowledge of the nature of the land; (2) of the influence its location may have on its vegetable products; (3) of the means at one's disposal.

MEANS OF COMMUNICATION.

Having perfected the methods of cultivation and the development of agricultural production, the Government should utilize the proceeds of taxation by inaugurating the construction of good cart roads, establishing a good system of neighborhood roads, and undertaking canal works, which fertilize the lands, give an outlet for its products, life to internal traffic, and food to external traffic. In this way abundance, cheapening the products of the soil, will increase the wealth of the country without detriment to the laboring classes. Ease of communication and the proximity of places where the cultivator can dispose of his goods are a real and positive advantage which can not fail to enter into consideration and to powerfully influence the value of a piece of arable land. It is never well to lose sight of the capital represented by herds and animals used for transporting farm products to market, whose cost should be deducted from the proceeds of the sale of these same products. In this connection, those agriculturists do not calculate well who are accustomed to transport the products of their farms for a long distance in order to get a profit which is apparently greater but in reality much less than the expenses occasioned by the journey.

COMBATING FALSE NOTIONS.

If agriculture in the Philippines is to reach the state of prosperity of which it is susceptible, it is necessary for the Government to duly foster the diffusion of agricultural knowledge and cause this empiricism, which nullifies with its tenacious opposition to every sort of improvement the natural fertility of the Philippine soil, to disappear. Wherever the sight rests in the Philippines the fatal results of this empiricism, the inevitable consequence of indifference, are seen. Cultivation in a miserable state, on account of the lack of well-directed labor; weak and degenerate stock. These are the two industrial elements which separately, as a rule, dispute the development of this territory. Outside of a more or less circumscribed radius around the great centers of population, in which there is more or less local consumption, but always of some importance, it is a chimera to expect large profits for the cultivator and improvements in the agricultural art, without machines, which simplify and cheapen labor; without live stock, which at the same time that they supply the motive power economically and plentifully for said machines, also furnish the manure so necessary to all agricultural development.

INTRODUCTION AND PROPAGATION OF NEW PLANTS.

The introduction of new plants and their propagation throughout the provinces is advisable, such as that of the mulberry tree, which formerly gave such good results in the silk industry. It would be advisable likewise to culti-

vate the nettle for the valuable fibers and sorghum for alcohol and sugar. Many oleaginous and dyeing plants and even sugar cane would give larger and better crops with better means and careful processes in the different operations of the respective industries. The use of fertilizers, almost unknown to the natives, should be introduced. The many places that are not used for anything should be made use of for herds of horses and cattle.

SPECIAL REMARKS.

One of the first measures which should be taken is the increase of the number of model farms and agronomic stations, so that the agricultural necessities of all the archipelago may be studied in a perfect manner, because the climatology and telluric conditions are as different as the islands are different which compose this extensive archipelago.

The island of Mindanao, where all the most important products of the archipelago can be easily cultivated, and where on account of the lack of population they can not be taken advantage of, demands special attention on the part of the government. To this end, it would be advisable to plant in that region, besides a model farm with its corresponding agronomic stations, some private companies or societies of colonization and development, managed by persons of undoubted honesty and of competent knowledge for such business, for the ground is worth as much as the man.

CHAPTER I.

GRAMINEOUS PLANTS (GRASSES).

We include in this group species of the family of grasses which are of great interest in the Philippine Archipelago, serving as food for man and beast, and as articles of common use for the natives. Among these are rice and corn, grass and reed grass, and the common cane or bamboo.^a

PALAY, OR RICE (*ORYZA SATIVA* L.).

This cereal, native to the marshy regions of hot countries, is one of the most important of this class as a foodstuff and industrial product. It is the principal food of all Eastern peoples. In the Philippines it is the principal crop upon which the sustenance of the indigenous population depends. All the other crops together would not be sufficient to cover the loss of this one, upon which the poor classes depend. A large number of varieties exist, as was seen in the collection presented by D. Regino Garcia at the Colonial Exposition, in Amsterdam, and which contain more than 120 varieties. The collection of 120 varieties presented by Señor Garcia at the Exposition of Paris in 1878, received the only gold medal presented by the judges to Philippine exhibitors. Two main divisions are made, according to the manner of cultivation. First, those varieties cultivated on the lowlands (irrigated lands), and second, those cultivated on uplands (dry lands), the latter being more numerous. Rice is supposed to be of Asiatic origin, and is the plant concerning whose cultivation the most ancient documents exist. Its introduction into the Philippine Archipelago was much anterior to the discovery of the islands. Morisqueta, or rice boiled in water without salt, is looked upon by the natives in the same way as we look upon bread.

The varieties of greatest importance are: Mimis, greatly esteemed on account of its white, transparent grain and exquisite flavor; Dumali, an early variety; Bontot-cabayo, and others which may be cultivated either on lowland or on highland.

The cultivation of rice is one of the few occupations which the native pursues with care, although they do not have at their command everything necessary to make the production most profitable. For the cultivation of lowland rice the ground is divided into little parcels, generally rectangular, and having a slight inclination, and which are surrounded with little dikes called pilapil, which serve to retain the water. The rice is sown by hand in little beds of moist earth: This seed rice is selected during the springtime. While these seed beds are sprouting the flooded lands are worked, the carabao (water buffalo), which serves admirably for this purpose, being used. In this way the soil is worked into a soft mud. When the rice has grown to a height of 20 centimeters it is pulled from the beds, formed into bundles, and taken to the place where it is to be transplanted. Regular lines of little holes are made in the softened earth, in each of which is placed a little bunch of six or seven stalks. The soil is not fertilized, nor is any other care given to the crop. When harvest time comes, which is usually in August, or from that time on, according to the variety of rice and the character of the soil, the plants are cut one by one, by means of a little sickle, or the yatap. This latter instrument consists of a little blade of steel or of tin, semicircular in form, fixed into a little handle.

This palay is now placed in heaps called mandalas. The grain is now separated from the straw by thrashing, in which operation water buffalo play an important part. At other times this thrashing is accomplished by pounding the

^a We do not include sugar cane in this group, considering it a commercial product which will be included in the last group.

straw in a large wooden mortar, called a lusong, or simply by striking the bundles against a stone. When there is sufficient wind the grain is separated from the straw and the dust by its use. It is finally separated from the husk by pounding it two or three times in the wooden mortar, or by making use of a sort of handmill, called gullingan.

On the highlands it is necessary to go over the ground two or three times and break up all clods. The seed is sown by hand after the first heavy rains, and without other care the crop is finally collected. The natives of the interior, and even some of those of the Christian towns, are accustomed to plant rice on virgin soil, in the preparation of which they are compelled to cut down all trees. Some of these are burned and others are used to make fences about the field.

The rice plant has many enemies, the most important of which is the locust, which, when it appears, totally destroys the crops. Another insect attacks the young and tender grain, sucking out the juice and leaving it completely empty. Another enemy is the maya (*Munia oryzivora*, L.), a small bird abundant in the lowlands. Sometimes monkeys injure the crop in certain regions.

The production of rice has diminished in the Philippines on account of the increased production which has taken place in adjacent countries. The Chinese market, to which formerly a large amount of Philippine rice was exported, supplies itself at present with greater economy and in greater abundance with the rice from Cochin China. This latter place even supplies the Philippines with rice whenever the crops are short. Again, lands which formerly produced rice for export are now given over to the cultivation of sugar cane, with great advantage to the general wealth of the country.

CORN (ZEA MAYS L.)

Corn is a cereal which sometimes gives abundant crops. It is a monolcous plant of great importance on account of its grain, its flour making excellent food. It is used likewise as food for cattle, as are the leaves and young stalks, which make excellent fodder. And, finally, an alcoholic drink, which the Bisayans call pangasi, is made from it. It is of American origin, from whence it was carried by the Spaniards. At first the natives received it with indifference until, on account of frequent losses of the rice crops, they became accustomed to its use. Its cultivation has become quite generalized throughout the archipelago, especially in those regions where the soil is not altogether suitable for the cultivation of rice, as in Cagayan and Isabela. In many towns it has taken the place of morisqueta, being reduced to a coarse granular flour by means of the gullingan, and then boiled in water without salt.

ZACATE (GRASS).

Under this name are included several species of grasses which make up the forage of the live stock, especially horses. The chief ones of these belong to the genus *Leersia*. The fields where this grass is raised are the objects of much care on the part of the native farmer, especially if they are in the vicinity of large centers of population, as the returns are excellent. The grass is cut several times a year.

COGON (SACCHARUM KOENIGII RETZ.).

This grass reaches the height of 2 meters, forming a sort of forest almost impossible to traverse without first making a path, either by means of fire or with a knife. The natives, with the object of obtaining fodder, are accustomed to set fire to these grass fields in the dry season. They are thus able to obtain the young shoots, which when not more than 18 inches in length are much relished by cattle. In regions where the nipa does not grow, cogon is used for thatching the houses.

SORGHUM OR BATAD (HOLCUS SACCHARATUS BL.).

Although this plant has given excellent results in the United States and other places when cultivated for sugar or the production of alcohol, in the Philippines it is used only for fodder. This is true of a number of other plants belonging to the genera *Paspalum*, *Millum*, *Panicum*, *Sporobolus*, *Chloris*, *Avena*, *Poa*, *Bromus*, *Agrostis*, etc., which grow on the pastures of the mountains.

BAMBOO.

Under this name are included various species of cane of the genus *Bambusa*, which are of great importance in the Philippines. The principal species are *Bambusa diffusa* Bl., *B. monogyna* Bl., or *Cauayang quilang* B., *pungeas* Bl., or *Cauayang totoo*, *Bambusa mitis* Bl., or *Taivana*, *Bambusa lima* Bl., or *Anos*, and *Bambusa textoria* Bl., or *Calbang*. All of these bamboos are used for many things, but the most useful of all is the *Cauayang totoo*, which at times reaches a diameter of more than 20 centimeters and a height of more than 12 meters. It is employed principally in the construction of native houses, which are often made wholly of bamboo, except for the rattan used to tie it together and the cogon used as thatch. The posts, floor, rafters, and doors are all made of bamboo, and the native is very skillful in working it. Either entire or split into strips, it is used in the construction of boats, rafts, bridges, aqueducts, scaffolding, vessels of all kinds, baskets, furniture, fishing apparatus, arms, rope, etc. This plant, together with the cocoanut tree, the nipa palm, and the rattan, are truly providential for these countries.

CHAPTER II.

VEGETABLES.

In this chapter are included those plants of the family Leguminosæ which serve as food, those whose tubers are edible, those roots which are edible, and, finally, the plants cultivated in the gardens.

DIVISION A.—LEGUMES.

MONGO, FRIJOL, AND OTHERS.

Leguminous plants are of but little importance in this country. One of the most commonly cultivated is the mongo (*Phaseolus mungo* Bl.), smaller than the lentil, but of the same flavor, and which is cultivated on a large scale, as it is the principal food of many towns. The butingui (*Phaseolus vulgaris* L.) is the true kidney bean, which is found in considerable variety in the garden. The zabache (*Phaseolus lunatus* L.) is also greatly prized. The sitao (*Phaseolus caracalla* L.) produces a vegetable about a foot long. The frijol from Abra (*Phaseolus tunkincensis* Lour.), and the patani (*Phaseolus inanimus* L.) are both highly prized by the natives. There are also some species of the genera *Dolichos*, *Vigna*, *Pachyrhizus*, and *Prophocarpus*, which produce vegetables or edible seeds less highly esteemed than those of the genus *Phaseolus*.

DIVISION B.—TUBERS.

SWEET POTATOES (*IPOMŒA BATATAS* LAMK.).

Although the origin of this plant has been much discussed, it is believed to have come from America. Its tuber, which is commonly called camote, is very suitable for food, and its cultivation is greatly favored by mountain races, which would seem to favor the antiquity of its introduction. The plant grows in five or six months, extending its shoots in all directions, completely covering the soil with its abundant leaves, which are likewise edible. When the ground is given over to the exclusive cultivation of this plant it is allowed to take root in all directions, and, as the roots extend and grow the tubers continually, they may be dug up for use at any time of the year. When its cultivation alternates with that of rice or corn it is necessary to plant anew each year, the product usually being of greater value than in the previous years.

THE POTATO (*SOLANUM TUBEROSUM* L.).

The plant originally came from the Andes, and was introduced into Spain after the conquest of Peru. After that its use extended over the rest of Europe, especially after the tests by Parmentier, who during the last century demonstrated that the potato was not poisonous, as was believed, but that, on the other hand, it was very useful as a food. These tubers have about 20 per cent of solid matter, and more than 80 per cent when desiccated at a temperature

of 120 degrees. In Europe they form the basis of the food supply of the lower classes, and are of industrial value, especially in the manufacture of alcohol.

In the Philippine Archipelago this valuable tuber has not done well, and is only cultivated with success in certain elevated localities, such as the district of Benguet.

DIVISION C.—ROOTS.

GABE (COLOCASIA ESCULENTA SCHOTT).

This plant, introduced a long while ago from Asia, is to-day extensively cultivated in almost all the islands, especially in the mountain regions. Its large roots and young leaves make an excellent food for the natives. The badiang, which is cultivated principally in the Visayas, has the same uses. There are three principal varieties, the best known of which is the variegata.

UBE, TUQUI, ETC.

Various species of the same genus *Dioscorea* are found either growing spontaneously or being cultivated for their edible roots. Among these are the ube (*Dioscorea alata*), the tuqui (*D. sativa* L.), the paquit (*D. divaricata* L.), the nami-conot (*D. pentaphylla* L.), the tongo (*D. papillaris* L.), and others. They all have large roots and sometimes attain enormous sizes. They may be eaten boiled or without other preparation than leaving them in water for some days. The tuqui and the ube, being most highly prized, are most extensively cultivated. The rhizome of this latter makes a healthy food of a sweet taste. It is somewhat sour when raw, but is rendered sweet and nutritious by boiling. Its cultivation is simple, somewhat similar to that of the potato. It is necessary to carefully prepare these tubers for eating, for when this is not done they are poisonous.

DIVISION D.—GARDEN PLANTS.

PRINCIPAL SPECIES CULTIVATED IN THE PHILIPPINES.

Although the natives do not care much for the cultivation of these plants, gardens are found near the large centers of population, generally cultivated by Chinese, the products being used by Europeans. Among those cultivated are the following: Onions, garlic, asparagus, radishes, cabbages, artichokes, endives, peppers, tomatoes, carrots, celery, parsley, and the haras (*Anethum feniculum*), a native plant whose fruit contains seeds having a sweet flavor similar to anise. Of the family Cucurbitaceæ there are also a large number of plants which are generally eaten boiled. Among these are the common squash, of which there are several varieties, the condol (*Cucurbita aspera*), which is oval in shape and very suitable for making sweets. A variety of squash known to the natives as calabasang bilog (*Cucurbita sulcata*), which is of a green color, much prized and extensively cultivated, and the tabayag (*Lagenarie vulgaris*), the meat of which is soft and smooth to the touch. The genus *Cucumis* is represented by no less than four species in the Philippines. The tabacog (*Cucumis melo*), which is the true melon, and which, although possessing a delightful aroma, never reaches the excellent flavor of those of Europe. The pepino, or cucumber, which is eaten boiled or pickled. The patola (*Cucumis acutangulus*), large in size, and eaten green or boiled. The milondaga (*Cucumis luzonicus*), small in size and with a flavor similar to the cucumber, and the watermelon, sandia, or pacuan.

Albay is the only locality where the strawberry occurs.

CHAPTER III.

FIBER-PRODUCING PLANTS.

IMPORTANCE.

The so-called textile plants are those which furnish fiber for the manufacture of cloth, cordage, etc. They are called industrial because of the large number of hands employed in the manufacture of these products in the great manufacturing centers. The principal ones found in the Philippines are hemp, cotton, the pineapple plant, ramie, agave, cabo-negro, rattan, pandan, and palma buri.

MANILA HEMP (*MUSA TEXTILIS* L.)

This plant is greatly appreciated for the excellent quality of its fiber, which constitutes one of the chief articles of exportation. Its principal cultivation is in the provinces of Ambos Camarines, Albay, Sorsogon, and Catanduanes, in the islands of Samar and Leyte, and on a smaller scale in Cebu, Mindoro, Marinduque, and the north of Mindanao. In Negros it grows well only in the southern part, and in Panay the small quantity gathered is of inferior quality. The fiber is obtained from the outer of the sheathing leafstalks, which in these plants forms the apparent trunk, as in bananas. This sheath is cut into lengths and then into strips, which are called *sajas*. There are many varieties of hemp, in some places as many as fourteen. The differences between these consist in variations in color in the bulb and lower part of the trunk, in the greater or smaller number of shoots, and in the development and strength of the fiber. In Albay experts distinguish varieties according to the size of the stalk, the shape and size of the leaves, and especially according to the strength of the fiber in the *sajas*. Even though experts recognize these characteristics in each variety, it is very difficult to do it at first sight, as the different names given to the different varieties in the different localities cause some confusion in the determination of them.

Cultivation.—This plant needs a moist climate, the lack of which is sometimes supplied by planting trees, which furnish shade and prevent the loss of water, which, by evaporation, is continually going on from the broad leaves. These trees also aid by drawing moisture to the surface by means of their long roots. Trees having high branches, narrow leaves, and deep roots are those most serviceable for this purpose. The lands should be open and moist, but not swampy. Sloping lands having a clay soil, situated on the hillside or mountain sides, are suited to the cultivation of this plant. The best fertilizer is the refuse of the plant itself left after the extraction of the fiber, as this contains the same elements which have been taken from the soil. Other articles, such as ashes, or any substance which contains potash and soda, may be used. New plants are grown from shoots or suckers, called by the natives *saja*, which grow about the base of the plant. The plants may be grown likewise and with considerable economy from tubers and from seed, but these methods are rarely used. For new plantations recently cleared mountain lands are used, a few trees being left for shade, the trunks and branches of the others being burned. After the ground has cooled the shoots are planted in little holes $1\frac{1}{2}$ or 2 meters apart. As the little shoots are very slow in growing, some other plant is usually sown on the same field to check the growth of weeds which might destroy the hemp plant. For this purpose the sweet potato is most serviceable. At the end of three years the plant has reached its full development, the most suitable time for cutting being when the fruit begins to show, as the fiber is then in the best condition. The trunk is cut down with a sharp machete or knife. The lower part of the trunk and the leaves are then cut off and the external layers of the plant or those containing the fiber are then removed and carried to the workhouse where the fiber is extracted.

Enemies of the hemp plant.—Two insects, the larvæ of which are called by the natives *tamiloc* and *amarog*, pass through the metamorphosis in the trunk of this plant. The former of these measures about 4 centimeters in length, the latter $1\frac{1}{2}$ centimeters. A large hole may be observed somewhere about the lower part of the plant attacked, which soon assumes a yellow color and dries up before reaching half its full size.

Production and price.—There has been a constant increase in the area of land devoted to the cultivation of hemp. It is estimated that the annual production of the archipelago is more than 1,000,000 piculs. Hemp is classified in commerce in three grades—current, second, and colored. The price of the first grade between the years 1885 and 1894 varied between \$17.12, its highest price, and \$6, the lowest price, per kilogram. The other two classes sell at prices from 25 to 40 per cent lower than the first. All of these prices are those of the market of Manila, being somewhat less in the provinces.

The cultivation of hemp began to assume important proportions in the Philippines in 1855, at which time it was second in importance among articles of export from these islands. It is exported principally to the United States and to England, small quantities going to Spain, Australia, Singapore, and China.

COTTON (*Gossypium herbaceum* L.).

This plant is cultivated in the Philippines and the provinces of North and South Ilocos, Union, Pangasinan, and Abra. The species cultivated are *Gossypium herbaceum* and *G. perenne* and *Ceiba pentandra*. The first two are known to the natives as capas and bobuy, and the latter as capasanglay. They are respectively herbs, bushes, and trees. The capas or herb is the only one which is really cultivated and whose product is used in the manufacture of cloth. The others are found growing wild, the cotton being used only for making pillows and mattresses.

Cultivation and preparation.—The soil should be open, strong, and easy to work, and should be deeply plowed and carefully prepared. It should be planted, when there is no danger of heavy rains, in furrows a meter apart, the plants being an equal distance apart in these furrows. When the fruit is ripe it is collected and the cotton is passed through a series of manipulations, rendering it suitable for the manufacture of cloth. The first operation is the separation of the cotton from the husk, after which the fiber is separated from the seed, to which it strongly adheres. This operation is accomplished by the means of a little hand machine, called laddit, which is composed of two parallel wooden cylinders revolving in opposite directions. The cotton is passed between the cylinders and separated from the seed. With this primitive apparatus one man working ten hours can obtain 3 or 4 kilograms of clean cotton. The cotton is then spread on drying tables, after which it is ready for spinning. The enemies of the cotton plant which menace production are the curiat, or field cricket; a gray caterpillar which is the larva of a butterfly (*Noctua subterranea*); and the larva of *Melolontha vulgaris*, called by the natives abaleng.

PINEAPPLE (*Bromelia ananas* L., OR *ANANASA SATIVA* LINDLEY).

A plant of the family Bromeliaceæ, which is cultivated for its delicious fruit and for the fiber which is obtained from its leaves. This latter is similar to that obtained from the agave. Its origin is tropical America, from whence it was spread to Africa, Oceania, and even to Europe. The pineapple has about the same geographical distribution as coffee, but is grown on some mountains at an altitude not suitable for coffee. It requires an even temperature which does not fall below 18° C. It will grow on almost any kind of ground, but gives best results in open, strong soil. It grows from the seed, which is sown in parallel lines 1½ meters apart, the individual plants being one-fourth meter from each other. In Cuba it is cultivated almost exclusively for its fruit, which has an exquisite flavor, and is sweet, aromatic, and slightly tart, on account of the presence of malic acid, which makes it somewhat indigestible. In the Philippines it is of more importance as a textile plant.

Method of obtaining the fiber.—The fruit of the plant is first cut so that the leaves may become as long and broad as possible. When these leaves are well developed they are torn off and then scraped with a fragment of glass or some other sharp instrument so as to separate the fleshy part and leave the fibers behind. It is then washed, dried in the sun, and combed out. It is classified in four grades, according to its fineness, and is then employed in the manufacture of fabrics in the same way as Manila hemp. The finer filaments are woven in very rough looms into a most delicate cloth. This commands a high price, and is used for making handkerchiefs, waists, and other garments. This cloth is very highly prized in the Philippines, as much as 20,000 reals having been paid for a single embroidered suit.

RAMIE (*Boehmeria nivea*).

This plant, of the family Urticaceæ, probably has its origin in Java, Sumatra, or the southern part of China. It is a nettle, like those of Spain, but without needles. It is cultivated for its fiber, which is formed on the outer part or bark of the plant. It grows to a variable height, according to climate and soil, of between 1 and 2½ meters. Beyond doubt the famous Canton linen is manufactured from this excellent fiber, which rivals flax. In spite of the excellent quality of this fiber the cultivation of this plant has not increased, on account of the difficulty of extraction, which can only be profitably done with special machinery. In the Philippines it is found only in the Batanes Islands and the north of Luzon.

The plant *Urtica arborescens* Bl. or Dalonot, whose fiber is employed for the same purposes, also exists.

AGAVE (*AGAVE AMERICANA* L.).

This plant, belonging to the family *Amaryllidaceæ*, comes originally from America. Its fleshy, sharp leaves, bordered with a row of spines, furnish a fiber from which delicate cloth niplis is made. It is cultivated on a small scale in certain localities in the Philippines. The Tagalogs call it magul, or magüey. It is exported in bulk to England, China, Japan, and Egypt.

CABO-NEGRO (*ARENGA SACCHARIFERA* LABILL.; *CARYOPA ONUSTA* BL.).

This plant, called cauong by the natives, belongs to the family of palms. Along the edge of the stem of the leaf are long, black, and very strong fibers, which are useful for the manufacture of ropes and cordage. These are very durable and resist moisture and even salt water. It is used also in making walls or partitions, and has some other uses which will be mentioned later.

RATTAN (*BEJUCO*).

Of the genus *Culamus* there are several species called by the natives dilan, yantoc, talola curag, and palasan. These spiny, climbing plants, which sometimes attain a length of 200 meters, furnish to the natives a useful material of most extended application. All the framework of the houses built of bamboo and nlpa, and many of those built of wood, are held together only by strongly laced bands of rattan, this article supplying the place of nails. These rattans are also employed in the rigging of all the smaller boats, and in the making of rafts, etc. In some of the provinces hats and sacks or bags are made from rattan and in other places chairs and other articles of furniture.

PANDAN (*PANDANUS SPIRALIS* BL.).

This plant belongs to the family *Pandanaceæ*. Its leaves are used for the manufacture of hats and sacks, an industry developed in Lucban and the province of Tayabas. The huge, wide leaves of the palm called burl (*Corypha umbraculifera* L.) are also used for this purpose. In the same way the split stems of the leaves of the nito (*Lygodium semihastatus* Del.) are utilized.

CHAPTER IV.

PLANTS FROM WHICH OIL IS OBTAINED.

COCOANUT (*COCOS NUCIFERA* L.).

This is one of the most important plants of the archipelago, satisfying, as it does with its various products, so many industrial, economic, and medicinal wants. It will be discussed here simply as an oil-producing plant.

It belongs to the family of palms and comes from India. Many varieties are found in the Philippines, especially in the Visayan Islands. The chief ones of these are called cayumanus, limbaon, dahlili, and macapuno, the chief points of difference being in the fruit.

Cultivation.—This plant will grow almost anywhere and does not demand any particular kind of soil. Nevertheless, if a plantation is to be established, it is best to choose land situated near the sea, having a reddish soil mixed with sand, as the salt water and the regular winds seem to benefit the trees. It is not expedient to place plantations on highly elevated ground, as the winds easily uproot many trees. Young trees grow from the perfectly ripe fruit. In Cuba, where the cultivation of the fruit is carried on with much care, beds for sprouting the seed are made in suitable soil, and the young trees are carefully guarded. In the Philippines the nuts are placed without any preparation close together in beveled beds, where they are exposed to the influence of the air. In following this procedure it is a year before the plant reaches a height of a meter. Another and shorter method is to hang the nuts on trees in such a way that they are partially protected from the sun, but exposed to atmospheric influences. In this way the plants will attain the height of a meter within five months. The small trees are now transplanted into previously prepared soil. The holes in which they are placed should be not less than 1½ meters in diameter in loose soil and 2 to 3 meters in mountain soil. The plants should be from 8 to 12 meters apart, according to the character of the soil, and the transplanting

should be done just before the beginning of the rainy season. After planting they require but little care. Weeds must be kept out, insects destroyed, the dry leaves cut away, and in certain cases, when the dry season is very prolonged, irrigation must be resorted to during the first few years. It is a good idea to cultivate some other crop, such as corn or the mungo, for the first few years. On good land the plantations begin to bear fruit at the end of seven years; on poor lands no fruit is borne for ten or twelve years.

Diseases.—The diseases of the cocoanut tree are brought about by atmospheric conditions or by animal or vegetable parasites. Among the first may be mentioned excessive humidity, especially when the water lies about in pools, and an unusually prolonged dry season, very strong winds, and earthquakes. Earthquakes produce such an effect upon the vegetative functions of the tree that ordinarily many of the nuts drop off within a short time. Among animals may be mentioned crows, rats, and bats, which cause but little damage. Locusts at times devastate the plantations, eating not only the leaves but the leaf ribs. Hogs sometimes destroy the young trees. The beetles *Rhynchophora ochreatus*, *Eydana*, and *Rhynchophora pascha* Bohem., called by the natives Bagañgan, penetrate the terminal bud of the tree and destroy it in a few days. These insects are destroyed by pouring into the holes they make ashes, sand, or an infusion of tobacco. Among parasitic plants may be mentioned a fungus (*Uredo cocivora*). This microscopic plant collects on the terminal bud of the tree and destroys the outer covering of this organ, the fungus appropriating the nutritive elements to its own use. This operation destroys the tree in a short time, as the fungus multiplies from its spores with great rapidity. The best treatment consists in destroying the affected or suspected trees with fire.

The analysis of the meat of the cocoanut, according to Buchwer, is as follows: Water, 31.8 per cent; stearin and olein, 47 per cent; albumin, sulphate of calcium, and sulphur, 4.3 per cent; potassium and other salts, 11 per cent; insoluble woody fiber, 8.6 per cent.

The nuts are collected every four months. They are taken to market in such vehicles as are used in the country or, if possible, by water, when a raft is formed of the cocoanuts themselves, having simply a rope about them to prevent them from separating. The owner rides on top of this raft of cocoanuts.

Uses.—When the fruit is to be used for the manufacture of oil a disk of the outer husk, called by the natives bonot, is first cut from either end. The rest of the husk is then removed by means of a conical-pointed iron which is fixed in a piece of wood. The inner covering, or shell, is then divided into two parts. The adherent meat is then separated from the shells by means of a semicircular knife fixed in a wooden support, or perhaps by a spherical iron grater, which is fastened to the end of a wooden shaft lying horizontally and which is turned by means of pedals. When extracted in this manner the meat of the nut is deposited in a large wooden tub which has a hole in the bottom for the escape of the oil, which flows from the mass simply by exposure to the sun; but this process is very long, as to extract all of the oil requires a month or more. It is likewise very imperfect, as the decomposition of extraneous material imparts to the oil a dark color and an almost insupportable odor. A better and more general method of extracting is by means of fire. The cocoanut meat is placed in suitable receptacles or in specially prepared ovens and boiled, or it is placed in large kettles having a slow fire underneath. During the boiling a froth containing extraneous material is thrown away. It is usual to express the oil from the meat, as a much larger quantity is obtained. If the nuts are good ones and the operation is done with care, 5 liters of oil should be obtained from 30. The natives use this oil as a condiment, and while still fresh as a purgative. It is greatly used for lighting purposes and in the manufacture of soaps. Both in the Philippines and Europe it is used in the manufacture of perfumery.

BENNE SEED (SESAMA, OR AJONJOLI) (SESAMUM ORIENTALE L.).

This plant, belonging to the family Pedaliaceæ, has been known in the Orient from the most remote time and is to-day cultivated in all tropical countries. The seeds of this plant contain as much as 53 per cent of fixed oil. This oil, somewhat similar to olive oil, and often mixed with it to adulterate it, has a sweet taste, although more insipid than olive oil, and is very slow in becoming rancid. In Egypt, Japan, and other oriental countries it is used in cooking in place of lard or olive oil. As it is an excellent article for making soap, it is an

important article of trade between Europe and Egypt and oriental countries. It is also used as a cosmetic and in the preparation of medicinal emulsions. The residue left after the extraction of the oil is used as a fertilizer and also as an excellent food for fattening cattle. Of that cultivated in the archipelago but a small quantity is exported. For perfect ripening this plant requires a temperature 30° C. and an even climate. It should be planted in places protected from strong winds, preferably on alluvial or clay soil of average fertility and capable of irrigation. The seed is sown by hand, after which the crop requires no care except thinning a little when the plants are from 12 to 16 centimeters in height. The crop is harvested when the stalks begin to fall and turn yellow. Great care must be taken in harvesting or the seed will be lost.

LUMBANG (ALEURITES TRILoba BL.).

This plant, of the family Euphorbiaceæ, is cultivated for the oil which is extracted from its seeds. This oil is of good quality, is used for lighting purposes and for calking ships, and is excellent for painting. The refuse left after the extraction of the oil is generally employed as a fertilizer for the betel palms. Lumbang oil is exported to China.

CASTOR OIL (RICINO) (RICINUS COMMUNIS L.).

This plant, a native of India, belongs to the family Euphorbiaceæ, known also as the Higuera infernal (infernal fig) and to the Tagalogs as tafigantafigan. It is cultivated for its seeds, which produce about 40 per cent of a purgative oil much used in medicine and which may be also used for lighting purposes.

A reddish oil very useful for illumination is extracted from the seeds of a tree (*Jatropha curcas*) belonging to this same family and which is known to the Tagalogs as tuba, in Iloilo as casla, and in Ilocos as tavatava.

THE PEANUT (MANI, OR CACAHUATE) (ARACHIS HYPOGÆA L.).

This plant, belonging to the family Leguminosæ, is a native of lower Guinea, from whence it was carried to Brazil, and is now cultivated in all America, the southern part of Europe, Asia, and Oceania. In the Philippine Archipelago it is cultivated on a small scale only as forage for cattle.

The most important use of mani is the extraction of a fixed oil from its seeds. This oil has the important property of not becoming rancid for a long time. If the climate is suitable and the cultivation carefully carried on, the seeds will yield half of their weight in oil, but as ordinarily cultivated they do not yield more than one-third. It is a pity that in the Philippines, which has a climate so well suited to this plant, its cultivation is not more carefully and extensively carried on. The oil is fluid, yellowish in color, without odor, and with a decided sweetish taste, which makes it inferior to olive oil. It may be employed in the preparation of toilet oils, soap, and lubricating oils. The residue obtained after the extraction of the oil, mixed with an equal weight of flour, is employed for making bread. It may be mixed with cacao for the manufacture of chocolate.

CHAPTER V.

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DIVISION B.—PLANTS PRODUCING STARCH.

The so-called feculas, or starches, are carbohydrates which exist in plants, constituting one of the most abundant of their proximate principles. They are found in the seeds of cereals, in vegetables, in tubers, in the trunks of various palms, in the roots of some plants of the family Euphorbiaceæ, and in various organs of many other plants. According to their origin they take different names—that from wheat and other cereals is called starch; that from the potato and other tubers, fecula, which is a generic term and is usually considered synonymous with starch; that from the yucca or cassava, tapioca; and that from the palm, sago. Here will be discussed only those plants from which some one of these proximate principles is extracted. They all furnish food of great nutritive value and easy of digestion.

CASSAVA, YUCCA, OR CAMOTING, CAHOY (*Jatropha manihot* L.)

This plant is an herb of the family Euphorbiaceæ, a native of tropical countries. It is notable for its roots, which contain an abundance of starchy fecula known by the name of tapioca, whose good qualities are so well known. In the Antilles, where it is known as yucca, it is cultivated with great care. The yucca or camoting cahoy, as it is called in the Philippines, grows well in both temperate and hot regions; the soil should be strong but not low, sandy and loose, so that the development of the root is not restricted; to accomplish this the ground must be plowed four or five times, finally leaving the straight parallel furrows one or two meters apart in order to allow the unrestricted growth of the plant. The plant is multiplied by means of buds growing from knots on the woody trunk, pieces of which are planted horizontally in the furrows and covered with nine or ten centimeters of earth. The roots of the camoting cahoy attain considerable size, and while they are still fresh they contain a milky juice which is poisonous, but this deleterious substance disappears upon boiling or simply upon exposure to the air for twenty-four hours, leaving the residue of the milky juice quite inoffensive.

According to Chemists Bontron and Henry, this poisonous principle is prussic acid in very small quantities, and in such a diffused state that it can not produce an instantaneous effect, but it does when concentrated. In order to utilize the root of the camoting cahoy as food it is necessary to grate it, wash it, and subject it to a considerable pressure to express the juice; the material remaining behind after these operations is the flour or tapioca. This material after being taken from the press is roasted on some hot surface, being continually stirred. The fecula or tapioca is very nutritious, some maintaining that half a kilogram a day is sufficient for one man. It is white or yellowish white in color, sweetish in taste, and somewhat insipid. It is much valued in medicine on account of its digestibility, and it is much used as an infant food.

ARROW ROOT.

This is also called maranta, and in the Philippines tagbac-tagbac. It belongs to the family Marantaceæ, of which two species are known: *Maranta indica* L., and *M. arundinacea*, the latter a native of America and the former of India. Both are important on account of their roots, which produce the starchy feculas known as arrow root and sago. The latter is a herbaceous plant, a meter in height, having lanceolate leaves about 15 centimeters in length, similar to those of the banana plant, even in the method of growing. The part of the stalk under ground gradually diminishes in size, to the point of insertion, into a long horizontal, fleshy-white tuber, which seems to be a rhizoma, and which contains a considerable quantity of fecula.

Cultivation.—It is cultivated with success in all loose, fairly damp soils. It is planted from buds which are placed separately in holes about 60 centimeters apart, as the plant is very leafy. The crop can be collected in six or seven months without further care.

 BURI (*Corypha umbraculifera* L.).

This plant is celebrated in all the Philippine Archipelago, giving name to the island of Burias, where it is found in abundance. It is found in all the other islands, although in some not in the same abundance as others. It belongs to the palm family, grows to a considerable height, is very beautiful, the trunk being adorned with an extended bunch of leaves. These are green in color, the young ones, however, being very white. It grows spontaneously in all parts, the natives never planting or cultivating. The leaves are very large and are different from those of the cocoanut tree; they extend from a single base in the form of a fan. This plant is of the greatest value to the natives. It does not produce fruit till after many years, and when it does once produce it, it dries up and dies. The fruit grows in bunches from the top of the tree, and is filled with little round nuts like hazelnuts. The fruit, however, is not edible.

Use and method of preparation.—To obtain the starch, the tree is cut down at the root, and all of the soft interior part of the trunk is taken out and placed while moist in casks or troughs, while some of the naturally bitter substances are drained from it; it is now pounded with sticks or mallets, when the starch separates in the form of very fine grains; it is then collected and dried and

made into flour, which serves as food for the natives, and some of which is sold in Manila and other parts. It furnishes an excellent, tasteful, and good food, which is called in commerce sago. In Buriias, Masbate, Bohol, and other parts where the tree grows in abundance, it takes the place of rice as a food stuff.

BAGSANG (METROXYLON BUMPHII MART.).

This palm, called Bagsang, is very common in the Visayan Islands and very useful to the inhabitants. They neither plant it nor cultivate it, as it grows spontaneously from the seeds which it produces or from the shoots which grow at its base. It generally grows along the banks of rivers and estuaries, in moist regions, and in places near springs. This plant has many uses in all times, but especially if there is a lack of rice or other food stuffs. To obtain it, the tree is cut down and stripped of its bark, which is called baje, and which is utilized by the natives in many ways. The interior or heart of the tree is then cut into strips, which are dried over a fire and saved for further use. It is then pounded in wooden mortars, being reduced to a sort of flour, which is of great nutritive value. It is most frequently made into cakes or fritters, which, when eaten with cocoanut milk, are very good and healthful.

LUMBIA, OR LUMBAY (METROYLON SILVESTRE MART.).

This is a palm very similar to the preceding one, but taller and larger and having wider and stronger leaves. It grows along the shore of the sea and along the banks of rivers and creeks and in other places where water is abundant. It grows from its small fruit, which is not edible. A species of flour is obtained from the heart of this palm, which serves as a food stuff to the poorer classes, especially during times of famine.

CAUONG (CARYOTA ONUSTA BL.).

This is a palm similar to the preceding, from whose trunk a species of sago is obtained. The method of extraction is that generally pursued. The tree is cut down and the fibrous material removed from the interior. This is pounded and then soaked in a cask, when a fine white flour settles to the bottom. The water is poured off, the precipitate remaining behind being a sort of sago.

PAGAHAN, OR BANGA (CARYOTA URENS L.).

This palm, although containing a poisonous substance, furnishes a starch, or kind of sago, of excellent qualities and in good quantities. It is prepared according to the methods already described.

CHAPTER VI.

PLANTS PRODUCING SACCHARINE AND ALCOHOLIC SUBSTANCES.

Two groups of plants are included in this chapter, the saccharine plants, or those which produce sugar and alcohol, and those from which alcoholic drinks are made. Only the species of both groups cultivated in the Philippines will be mentioned.

SACCHARINE PLANTS.

SUGAR CANE (SACCHARUM OFFICINARIUM L.)

This plant, known by the name of sugar cane or honey cane, belongs to the family of grasses. It is a native of India and China. In the Philippines it is one of the agricultural products of greatest importance. The sugar-producing provinces are Pampanga and the island of Negros, and on a smaller scale the Laguna, Bataan, Batangas, Iloilo, Cebu, Cavite, Pangasinan, Capiz, Antique, and Mindanao. There are many varieties of sugar cane, there being no less than twenty in the Philippines. The most important one cultivated, besides the ordinary variety, being the Batavian, which is distinguished from the common variety by the violet color of its stalks and the larger number of joints and its greater size; the Otahelte, which is taller and larger than the previous one,

and has a lemon-yellow stalk; finally the yellow or creole variety, which has a slender stalk, and is yellowish white in color.

Cultivation.—This plant for its full development requires a climate whose temperature is not less than 18° C., and which should be as high as 23° C. during the ripening period. The soil should be deep and of medium consistency and, preferably, clayey loam or silicious. The best fertilizers are manure, ashes, blood from the slaughterhouses, lime, and green stuff; fish, on account of the phosphorus which they contain; sulphates and phosphates of potassium, and better than all of these, the bagasse, or the refuse left after grinding the cane. The ground should be prepared by plowing three or four times, and finally by hoeing, leaving it perfectly soft and smooth. Little holes of varying depths are then made in the soil at a distance of a meter or a meter and a half from each other. In these are placed little pieces of the stalk, some 40 centimeters long, each one of which should contain eyes or buds. These should be placed in water twenty-four hours before planting. They are then placed four or five in a hole, somewhat inclined, and are covered with 4 or 5 centimeters of soil, and worked if necessary. Other care of the crop is reduced to irrigation, hilling, and necessary weeding. The cutting begins when the cane assumes a yellow color on the lower part of the stalk and when the juice shows 8° or 9° on the Baumé scale. The cane should be cut obliquely and when the earth is not too moist, as when there is an excess of moisture the blow of the machete or knife breaks the root and thus injures the plant. In the Philippines the cultivation of sugar cane is generally carried on with little care and intelligence, and this is one of the reasons why the quantity and quality of the crop has diminished. To increase the production, it will be necessary to perfect methods of cultivation, selecting the best varieties of cane, or those which are best suited for the existing conditions, and tilling and fertilizing the land with more care; so, too, much greater care should be taken in the manufacture of the sugar.

SORGHUM (SORGHUM SACCHARATUM PERS., OR SACCHARUM KOENIGII RETZ).

This plant likewise belongs to the family of grasses, and in its stalks are sweet juices which sometimes give as high as 17 per cent of prismatic sugar. In the Philippines this plant is utilized only for forage, although it might well be cultivated for the production of sugar in certain regions where sugar cane does not grow well. Sorghum demands the same kind of soil and the same cultivation as corn. It is planted in the same manner and should be weeded and hilled in the same way as corn. Alcohol for industrial purposes can be obtained from sorghum as well as from sugar cane.

ALCOHOLIC PLANTS.

Under this heading will be included such vegetables as contain glucose or other substances which can by means of fermentation be converted into alcohol or alcoholic drinks. In the Philippines these plants are nipa, cocoanut, buri, caugon, pugahan, maize, and others.

NIPA, OR SASA (NIPA LITTORALIS BL., NIPA FRUCTIFICAN THUNB.).

The nipa is a palm which grows to a height of 4 meters, and from whose short stem rise large leaves composed of a multitude of little ensiform leaflets. The fruit consists of various clusters lying very closely together, although they are easily separated, which together form a large bunch hanging at the end of a thick peduncle which arises from the base of the tree. It is indigenous to the coast and grows only in muddy regions, or those which are liable to be overflowed, or the mouths of rivers which communicate with the sea. It is one of the most useful trees found in the Philippines. As a thatch it covers a great majority of the houses and even some of the churches in the islands. Many of the native houses have the walls and partitions made of nipa, as well as the roofs; but of still greater importance than the leaf is the tuba or sap from which nipa wine or arac (arrack) is made and which is consumed to such a great extent by the natives.

Cultivation.—Nipa groves must be prepared by planting, which usually takes place between May and the last of July. The ripe fruits which fall to the ground are collected and employed for this purpose. Two or three of these fruits are placed in holes which are located about 1.7 meters from each other.

As the rains are very frequent during these months and the ground is kept moist it is not usually necessary to irrigate. This condition of moisture of the ground is also favored by the high tides. In order to get the best results from the grove all dead leaves, or those which could prejudice the development of the fruit, should be removed.

Method of obtaining the tuba.—A grove becomes serviceable at the end of five or six years. In order to obtain the tuba an incision is made in the peduncle immediately below the point of insertion of the fruit, leaving a few of the best developed fruits for purposes of reproduction. A liquid which flows from the incision is collected in bamboo tubes or joints called bombones, which are hung conveniently on the plant. In order that this sap shall flow with the greatest facility several little operations are gone through with. The first of these, called *scat*, consists in striking the peduncle of the fruit several blows, with the object of loosening somewhat the tissues and opening the pores. This operation should be done once a week during the five months preceding the producing season. Simultaneously the process called *talog*, which consists in cleaning the peduncle of all leaves, is gone through with. When the collecting season arrives the operation called *pucao* is gone through with. This consists in rapidly rubbing the foot against the peduncle so as to call the sap toward the fruit. After this comes *patit*, which consists in cutting the peduncle near the base and leaving the bamboo joint attached, in which the juice is collected as it falls drop by drop. After this the incision on the peduncle is renewed twice each day, morning and evening, the tuba being collected daily. The collecting season lasts about ten months, the production increasing gradually for the first five months and decreasing slowly from that time. The average production of a single plant is about 46 liters during the season. When the business is carried on on a large scale one half of the product goes to the owner and the other half to the workmen. The tuba is afterwards distilled and then concentrated in stills, and although the loss of liquid is great, there still remains a considerable amount. This tuba, when much fermented, may be used as vinegar. One hundred jars of this vinegar, each containing 48 liters, sells for \$10 or \$12.

THE COCOANUT (*COCOS NUCIFERA*, L.).

Method of gathering the tuba.—To obtain the tuba from the cocoanut tree the same is cut before the flower is formed and before it has appeared externally. A bamboo joint or bombone is then attached for the collection of the liquid. The flower cluster or summit is bound together with pieces of rattan so that the bamboo joint can be easily adjusted. As one tree may have several flower clusters, as many bamboo joints as are necessary are placed in position. A little of the powdered bark of the *tongog* (*Rizophora longissima*, Bl.) is placed in each bamboo joint; this serves to give strength and a reddish color to the wine. The wine is collected daily by men who carry large bamboo joints hanging over the back and held in place by a curved piece of wood. Attached to this large bombone, which is carried on the shoulder of the workman, is a rounded receptacle made of a shell of a cocoanut, which contains the powder already spoken of. Every time one of the small bamboo joints is emptied it is necessary to clean it perfectly on the inside and to renew the powder. This cleaning is done by a little brush or broom, which is made of a piece of the stem of the leaf of the cocoanut tree, which is carefully pounded on the end so as to convert it into a shorter brush. A small quantity of powder is then placed in the bombone and a fresh incision made in the flower stem. This cutting of the flower stem is done with a very sharp little curved knife. Each stem will produce wine for a period of two months, after which it dries out. In order to facilitate climbing the trees notches are made on either side, thus forming a sort of ladder. When a collection of tuba is carried on on a large scale, in order to avoid the loss of time involved in climbing each tree, large bamboos are tied from one tree to another horizontally, the two passing from tree to tree; one of these serves as a footbridge and the other as a hand rail. Men frequently fall from them, often with fatal results. This tuba begins to ferment within an hour, more or less, after its collection, and at the end of a day it has changed to a sort of vinegar, fermentation often being facilitated by the addition of suitable plants. The liquid is then distilled, the distillate being known as cocoanut wine.

BURI (*CORYPHA UMBRACULIFERA* L.).

This plant also produces a wine called tuba. It is obtained from an incision in the fruit, from which the juice issues. From this juice wine is made, and also a yellow honey-like substance called pacasas.

CAUONG (*CARYOTA ONUSTA*, BL.) AND PUGAHAN (*CARYOTA URENS* L.).

A sweet liquid or tuba is obtained in the same manner in the fruit of these plants.

There are also other plants of less importance from which the natives obtain their favorite drink, tuba.

MAIZE OR INDIAN CORN, ETC. (*ZEA MAYS* L.).

An alcoholic drink, called in the Visayan Islands pangasi, is obtained by the fermentation of the starch of corn. Several families generally unite to make this drink, and they generally end up by becoming very joyful and noisy.

CHAPTER VII.

AROMATIC PLANTS.

TOBACCO (*NICOTIANA TABACUM* L.).

Tobacco is a plant belonging to the family Solanaceæ, having straight cylindrical stems, wide soft leaves of a dark-green color, whitish-green funnel-shaped flowers, and numerous seeds contained in the two sides of a pod or capsule. It is an annual plant in Europe and evergreen in South American and other parts.

This plant is a native of America. It was introduced into the Philippines by missionaries in the last quarter of the sixteenth century by means of seeds coming from Mexico. Its cultivation spread rapidly on account of the favorable conditions of climate and soil, and the favor with which the natives looked upon it. From the Philippines it was introduced into the south of China.

Species and varieties.—The genus includes a large number of species and varieties widely distributed over all parts of the world. In its properties and uses it differs but little. The principal species and varieties are:

First, common tobacco (*Nicotiana tabacum* L.), called also tabaco macho, or male tobacco, which is the best of all. It is somewhat gelatinous or viscid. Its stalks reach a height of 1 meter, its leaves are oval or heart shaped, and its flowers purple.

Second, tobacco hembra (female), or Mexican tobacco (*Nicotiana rustica* L.), which has rounded leaves, and which is cultivated with good results in the south of France.

Third, verina, or Brazilian tobacco (*Nicotiana paniculata* L.). This is a small species, very mild, demanding a very warm climate. It is much used in Turkey.

The principal varieties of the first species are the Virginia tobacco, which has sharp leaves and does not require an especially fertile soil, and which loses but little in drying; Carolina tobacco, with shorter and narrower leaves than the Virginia tobacco and likewise less delicate in its growth. Tobacco growers, paying little attention to the botanical and scientific classification and more to the form and utility of the plant, divide it into two classes, wide leafed and narrow leafed. The qualities determining the price of tobacco in the market are combustibility, strength, aroma, fineness, elasticity, color, and uniformity. Philippine tobacco, which up to a short time ago was considered second best in the world, on account of its agreeable aroma, fine veins, and notable elasticity, has recently lost much of its reputation. Tobacco coming from the province of Isabela de Cagayan is considered the best in the Philippines. That from the Visayan Islands is coarser, more unequal in color, and of greater strength. The tobacco from Nueva Ecija is fine, but somewhat bitter in taste and yellow in color. That from Union, Ilocos, and the Igorots is of heavy body, broken, and frequently has but little combustibility.

Philippine tobacco may be divided into two groups: First, the varieties with elliptical or ovate, wide, or heart-shaped leaves, which is called in the provinces

"tobacco from the old seed;" and, second, tobacco with lanceolate, narrower leaves than the preceding, which is generally known under the name of "tobacco from new seed." The former comes from Mexico, and the latter is supposed to have been introduced recently from the United States.

Cultivation.—Although tobacco grows in almost all climates, the product is more abundant and much better when grown in hot climates, as the heat has a great influence in determining that important quality, the aroma, which it is impossible to impart artificially. The lands most suitable for its cultivation are those of medium consistency and depth, which are cooled during the summer time, or such as have a sandy or silicious subsoil covered with loam, which are situated along the banks of rivers which are periodically overflowed, thus adding new mineral and organic constituents to the soil. These lands are called vegas (meadows), and in this country the name of *vagueiros* is given to the workmen on such plantation. As the tobacco plant is very delicate, it is necessary to fertilize the soil thoroughly. Among fertilizers may be mentioned those which contain potassium, lime, chloride, and phosphate, the best being manure in an advanced stage of decomposition. The preparation of the soil, which should be very deep and carefully done, consists of three plowings at intervals of several days, and the completion of the process by grading and leveling and the removal of all injurious weeds.

The tobacco seed is sown in hotbeds, which are made on level, clean ground, having a carefully fertilized soil. The seed is selected from accredited sources and sown broadcast, being mixed with fine sand. These beds are about a yard wide, space enough being left between them to allow of the passage of weeder and other workmen. The seeds are covered lightly with earth, which is packed down a little and then irrigated, this operation being frequently repeated until the plants appear. These beds should be fenced in and covered over with branches, so as to protect the plants from the direct rays of the sun, but not interfere with ventilation. When the plants have four leaves this cover is removed, so that they may develop with greater vigor, and transplanting immediately begins. The plants are separated a distance of about 60 centimeters from each other. When the flowers begin to appear and 10 or 12 leaves have developed, the buds are cut from the extremities of the stalks, so that the sap may flow to the leaves and nourish them with greater vigor.

The gathering of the leaf is begun when the plant is in just the right condition, and the recognition of this is of the greatest importance for the quality of the tobacco. At this time the leaves begin to turn yellowish, wrinkle somewhat, droop, and show more or less of a sticky juice, according to the abundance or scarcity of rain during this period of ripening. This condition having been reached, the process of gathering begins. This may be done either by cutting off the stalk at the base, which is not a good way, or by collecting the leaves, one at a time, in the order in which they grow; or, beginning below, gathering a handful of two or three at a time. They are then classified according to size and quality, being left on the ground until they have dried. The tobacco is then tied in bundles, which are suspended by cords in the tobacco storehouse. They are thus protected from the sun, but are exposed to excellent ventilation on all sides by windows and doors, which are opened or closed, according to circumstances.

Diseases.—The tobacco plant is subject to injury from various kinds of insects which attack it. Among these the most dreaded is that called *cogollero*. This is a white butterfly, which is so called because it grows and develops in vegetables, such as cabbage and lettuce. The *gordo* is a large black worm which eats the stems of the leaves, cutting them and causing them to fall. The *cachasado* is the larva of *Hadena androgea* Lat., which lives and hides during the day in the roots of the plant. The *primavera* is very voracious, and the *babosa* and other small animals not so much dreaded.

Chemical composition.—The chemical composition of tobacco is very complex and variable, according to the kind and origin of the sample under examination. Vauquelin and other chemists who have analyzed it have found inorganic substances, such as silica, potassum, magnesia, ammonia, nitric acid, hydrochloric, phosphoric, and sulphuric acids; neutral organic substances, such as cellulose, oil, yellow and green resins, and a volatile alkaloid called nicotine. This is an oily, colorless substance of pungent taste and odor, soluble in water, alcohol, and ether. This alkaloid is found from 1½ to 9 per cent, according to the kind of the tobacco, and it is worthy of note that the best tobaccos, and those having the greatest reputation, are those which contain the smallest quantity of nicotine. Doctor Lebon, of Paris, has recently announced the presence of a new

alkaloid in tobacco—collidine—which is as poisonous as nicotine. Nicotine is very energetic and in a short time poisons small animals, but is much less active in the plant itself, as it is mixed with other less active and inert substances.

COFFEE (*COFFEA ARABICA* L.).

Coffee is a plant of great importance in the Philippines. It belongs to the family Rubiaceæ, is a bush 2 or 3 meters high, having permanent leaves and white, fragrant flowers like jessamine in appearance, which have five stamens grouped together near the base of the leaves. The fruit is an oval fleshy berry, somewhat resembling a cherry, having a clear, green color, which changes to intense red when the fruit ripens.

History.—This valuable fruit is a native of ancient Ethiopia, obtaining its name from the region called Kaffa, where it grows in great abundance. It was brought to the Philippine Archipelago by the Spanish missionaries toward the end of the last century, where it was first cultivated in the province of Laguna. It was afterwards naturally propagated easily and rapidly by a little mammal (*Paradoxurus musanga* L.), which fed upon the berries. Afterwards its cultivation fell to the lowest ebb in spite of premiums offered to cultivators. At the present time, due to the increased price of coffee and better facilities for exporting, its production has begun to increase.

Species and varieties cultivated.—Although there are many different species of the genus *Coffea*, but four constitute the coffee of commerce. They are: *Coffea arabica*, or common coffee; *Coffea racemosa*, or Peruvian coffee, very similar to the preceding; *Coffea laurina*, or African coffee, and *Coffea liberica*, or Liberian coffee, a more robust plant, which has larger leaves than the common coffee plant. Almost all of the varieties cultivated come from the first species, which is the one requiring most heat. In the Philippines the provinces producing most coffee are Batangas, Laguna, Tayabas, and Cavite in Luzon, and the districts of Cotabato and Misamis in Mindanao.

Cultivation.—Coffee requires a climate whose average temperature ranges between 16° and 24° C., and, therefore, next to sugar cane, is the plant requiring the greatest amount of heat. In localities having both heat and moisture its growth is stronger and more luxuriant, as is manifested in various ways. In very hot climates the coffee plant grows well, but should have the shade of some other suitable tree, whereas in cooler climates it thrives best without this protection. The soil most suitable for its cultivation is that which is light and moist, but not marshy. Reddish soils somewhat sandy, or black soils without too much clay, are suitable for its cultivation.

If the land is virgin soil it should be thoroughly cleared, plowed deeply two or three times, and then harrowed, and if old land, it should be well fertilized.

Planting can be carried on in various ways; the best are by means of hotbeds and by transplanting. These hotbeds or nurseries are made in well-shaded soil, which should be clean, well worked, and thoroughly fertilized. The seed should be ripe and fresh and not taken from the fleshy covering. Transplanting is done when the plants have three or four roots, care being taken not to injure the delicate stem, although a part of the central root is cut off at the moment of transplanting. Plants which have reached a height of 40 or 50 centimeters may be used by cutting off the upper part of the stem and likewise the vertical root, stamping down the earth about them and immediately watering. The ground where this transplanting is made should be previously prepared, holes being made in parallel lines running north and south, and having a distance of 2½ meters from each other. The land should afterwards be kept clean and other trees should be planted for their shade. The tree usually employed in the Philippines for this purpose is called madre cacao (*Galedupa pungam* Bl.), but there are many who advocate the use of the ballbago (*Hibiscus tiliaceus* L.) as giving better protection to the plantations and being more productive. Experience demonstrates that the pruning of coffee trees prejudices the production, as the plant growing naturally with favorable rains produces at the end of six or seven years an average of 5 kilograms of berries for each one, while those which have been pruned do not produce one-fourth as much.

The gathering is accomplished either by shaking, if the plants are high, or by hand picking if they are low. After gathering the pericarpium is removed, an operation easily accomplished by hand, and the berries are placed in the sun, care being taken to separate those collected on various days. When the berries are thoroughly dried the husk is removed by means of a mill or other apparatus. The other operations necessary to prepare coffee for the market are winnowing,

to separate the inner husk and all dirt from the berry, and sorting into first and second grades.

The coffee plant begins to produce in from three to five years, according to climate, soil, and cultivation; is in full bearing in six or seven years, and continues to be productive for thirty years if no accident happens. Philippine coffee compares well with that of Java or Martinique, but there are certain localities which produce coffee which, according to experts, can be compared only to that of Mocha.

From former times the production of coffee in the Philippines has fallen off greatly on account of the destruction of the plants by an insect of the genus *Xylotrechus* and by a fungus of the genus *Peronospora*.

CHOCOLATE (THEOBROMA CACAO L.)

Cacao or chocolate belongs to the family Sterculiaceæ, and is a native of Mexico and South America. It is a tree which is distinguished for its beautiful appearance, but more for its fruit, which is very highly prized, as is shown in its botanical name *Theobroma* (food for the gods). The seed of this fruit properly roasted gives out a delightful aroma, and well ground and mixed with sugar and a little cinnamon it forms chocolate, a nutritive, healthful, and agreeable food. It was introduced in the Philippine Archipelago from America some time between the years 1660 and 1670. Although it has been cultivated for a long time in small quantities in various provinces of Luzon and Visayas, it flourishes best in southern Mindanao, and in the district of Davao it is produced in large quantities and of excellent quality.

The tree reaches a height of from 8 to 11 meters and has straight branches. The petiolate leaves, oblong or ovate-oblong, are acuminate, strong, and smooth, and of same color on both sides. The small flowers are reddish in color and very numerous. The fruit is reddish or yellowish, ovate or oblong, having ten ridges, and simulates to a certain degree the shape of a small cucumber. The seeds are somewhat larger than an almond.

Cultivation.—This plant demands a warm climate having an average temperature of from 23° to 29° C. and a considerable amount of moisture in the atmosphere. The soil should be deep and light. Black and reddish soils, somewhat sandy, with an abundant top soil of muck, are excellent.

Planting can be done from the seed, and to save time this is usually done by planting the seed a distance of from 2½ to 3 meters from each other in parallel lines. In the Philippines the seed is often planted in bamboo joints or in the forest, from whence they are transplanted to ground shaded by banana plants. As the chocolate plant requires shade, the tree called madre cacao is usually planted. This plant requires much more care than the coffee plant. In its cultivation it is necessary to remove all premature flowers, trim off dry branches, and keep the ground well cleaned.

The fruit is gathered when it becomes ripe. The life of the chocolate tree is supposed to be about thirty years, during which time it produces fruit. It may live to be 50 years old or more, but is almost unproductive.

NUTMEG (MYRISTICA FRAGRANS HOUTT.).

The nutmeg grows naturally in Cebu and in Laguna Province, and will grow in all parts of the islands cultivated. It is a tree belonging to the family Myristicaceæ. In the Dutch possessions the tree reaches a height of from 10 to 13 meters. The trunk is covered with rather thin bark, blackish and slightly mottled, from which, when incised, flows a reddish juice which coagulates on contact with the air. The fruit is about the size of a small peach, having a thick husk and a hard pit about the size of an almond, inside of which the nutmeg is formed. This is surrounded by an aromatic rind, or skin, called mace. The beautiful flower of this tree is aromatic, and from it a kind of preserve, noted for its fragrant odor, is made.

The tree begins to produce at the age of 5 or 6 years, but the crop is very light at first.

CINNAMON (CINNAMOMUM BURMANNI BLUME; LAURUS CINNAMOMUM BLANCO).

The cinnamon tree is found in these islands, especially in Mindanao. In Zamboanga, Caraga, and in the mountains of the district of Misamis varieties of cinnamon of stronger taste and fragrance than those of Ceylon are found.

The reason it is not more exploited is because it seems to contain some kind of bitter principle, which is noticed when it is chewed. This tree should be more highly prized in these islands, as it grows wherever it is planted. The cinnamon comes from the bark of the branches which have been stripped of their epidermis, and is an aromatic substance, having many uses.

PEPPER (*PIPER NIGRUM*, L.).

This plant belongs to the family Piperaceæ. Its cultivation diminishes daily in the Philippine Islands. It is a climbing plant, which is fastened to adjacent trees when cultivated. Its fruit is a berry which, when dried, is black or white pepper. In the northern part of the islands the long pepper of British India can be cultivated.

BETEL OR ITMO (*PIPER BETEL*, L.) ; BUYO DE ANIS (*PIPER ANISORUM*, BL.)

The betel or itmo is a climbing plant, belonging to the same family as the preceding. It is cultivated very extensively throughout India, the Sunda Archipelago, all the regions adjacent to Asia, and the Philippines. In all of these countries the leaves are used in making the preparation which is known in the Philippines as "buyo." This preparation is composed of one of the leaves of this plant, a piece of lime the size of a pea, and a piece of bonga or betelnut. The object of this mixture is to mollify and render supportable the taste of the pepper leaf, which otherwise would be acrid and disagreeable.

The buyo de anis has a leaf which has an agreeable odor resembling anise. This leaf is used by some natives to mix with the pepper leaf in the preparation of buyo.

CHAPTER VIII.

MEDICINAL PLANTS.

PLANTS USED FOR DISEASES OF THE HEAD.

The castor-oil plant (*Ricinus communis* L.), of the family Euphorbiaceæ, which is called "tangan-tangan," is very abundant in these islands. It is used principally to alleviate headaches, being applied on leaves to the forehead, causing sweating and, consequently, relief. Mixed with the oil of sesame it is applied to the stomach with good effect; so, too, it is applied to the feet of persons suffering with dropsy.

Balocanad (*Aleurites trisperma* Bl.) belongs to the family Euphorbiaceæ. It has a fruit a little larger than the pomegranate. This fruit contains six or seven poisonous seeds. The oil of these seeds when rubbed into the scalp kills all vermin.

The leaves of the capanatolet or gaudarura, when properly applied, improve and cure those who suffer with pains in the back.

The so-called dadac has medicinal properties. Its stalk or stem is about the size of the index finger, somewhat flattened, and blackish in color. An infusion is made from this stalk chopped up finely. When the head is bathed with this infusion, headaches disappear, as does the lethargy from which the patient suffers. This is true when it is used in the treatment of any other cephalic disease.

PLANTS USED FOR THE DIGESTIVE APPARATUS.

The salibutbut or pandacaqui (*Taberna montana*) belongs to the family Apocynaceæ. An infusion of the root of this tree when given as a drink improves the stomach and bowels in cases of distention, cold, and indigestion. It is likewise an excellent blood medicine, and is used with great benefit by women after parturition.

The leaves of the taguyasin or alom are of value in any chronic stomach disease due to inflammation, overloading, or cold. They should be applied hot or united with oil used as an unguent. They are of great value in reducing inflammation or swelling of the limbs if used in the same way. They cause sweating, after which the limbs should be enveloped in a blanket, dried, and the operation repeated if complete relief is desired.

The leaves of the maisipaisi (*Clausena* sp. Bun.), of the family Rutaceæ, have an odor and flavor very similar to that of anise. From these leaves an

oil of anise is made, which is very useful for diseases of the stomach. Made as an infusion with cocoanut wine, it furnishes a drink much used in the country.

The tree known by the name of "bacao" furnishes a bark which, when pulverized and mixed with water, furnishes a remedy which kills all kinds of intestinal parasites. This same property is possessed by the fruit of a trailing plant called "tangulon," "pifioncillo," or "niogniogan" (*Quisqualis indica* L.) of the family Combretaceæ.

The tree called "bahay" (*Adenanthera pavonina* L.) produces a fruit something like ordinary beans in appearance, but of a bright red color. These placed in cavities of teeth greatly relieve the pain, the same object being accomplished by the root.

The grated bark of the maragaat (*Ficus radiata* Dec.), of the family Urticaceæ, when applied to the gums reduces swelling and strengthens the teeth.

The paetan (*Lunasia parvifolia* Muell.), of the family Rutaceæ, is an antidote for fish poison. Taken as a powder, it cures any stomach disorder and is an excellent remedy for ulcerating sores, which it cleans and closes.

The sambong (*Blumea balsamifera* DC.), of the family Composita, is an excellent sage, quite aromatic, and having medicinal properties. As an infusion it is much used in diseases of the stomach.

The tangulon (*Quisqualis indicus* L.), of the family Combretaceæ, is another species of trailing plant, which grows bountifully along the seashore, produces a seed called "pifioncillo," which is an excellent vermifuge. It may be eaten raw without danger of injury.

The cabcaban (*Polypodium quercinum*, L.) and the balsamina or apalla (*Momordica balsamina* L.) produce purgative medicines.

PLANTS USED FOR THE CIRCULATORY APPARATUS.

The sibucao or Brazil wood (*Cæsalpinia sappan* L.), of the family Leguminosæ, is medicinal. An infusion of it causes the absorption of coagulated blood, and it is given in cases where blows on the body have caused the extravasation of blood into the tissues.

The cumalibquib or himangcoran or otob-otob are medicinal. The grated root made into an infusion cleans and cures ulcers or wounds. An ointment is made from this plant and from the jalanotan and hagonoy. This is made by boiling the plant in oil, straining, and adding a little wax. The ointment may then be used for the cure of wounds. So, too, the leaves of a climbing plant grown in the Visayan Islands, and which is called "balangon," is useful for this purpose. The pounded leaves are applied directly to the wound.

PLANTS USED FOR AFFECTIONS OF THE SENSES.

The tuyucay is used as a remedy for deafness. In the operation a branch 8 or 10 inches in length is placed over a slow fire until it becomes quite hot. It is then placed close to the affected ear and air is blown through the hole which passes through it, care being taken to keep the branch well within the ear. It is claimed that the hot tube has some special virtue, due perhaps to the medicated moisture thereof, and when penetrating the ear restores it to a healthy condition.

The tree called "haulig" is very useful for treating and preserving the eyes, a solution in water of the bark and leaves being used as a wash.

PLANTS USED FOR THE SKIN.

The resin of culasi (*Lumnitzera coccinea* Wight and Arn.), of the family Combretaceæ, cures scab and itch.

A resin which serves well as a caustic is obtained from the canumay and the lagnoto (*Diospyros multiflora* Bl.).

The tree called panjantolon (*Scaevola koenigii* Vahl.), of the family Goodeniaceæ, an extraordinary large tree, is useful in medicine. An infusion is made from the leaves and bark which is used as a lotion for those suffering with specific trouble. This cures the disease and relieves the pain in the bones which accompanies this terrible disease.

The pila and the root of the trailing plant called mangadiao are both useful in treating all kinds of wounds.

All kinds of spots on the skin are cured by a lotion made from the roots of the tree called salac.

A lotion made from the wood of the mampol, of the genus *Loranthus* of the family *Lorantaceæ*, will cause the pustules of smallpox to appear when they are slow in presenting themselves.

The leaves of the little tree called alocloc when crushed and applied to boils or other cutaneous tumors quickly brings them to a head and causes the removal of their contents.

Sarsaparilla of the genus *Simlax*, called by the natives banag, is very common along the banks of the rivers and the coast. The root is used in medicine and is well known as a remedy for those who suffer from specific ulcers. It is given as an infusion.

The trailing plant called bago-bago, of the genus *Garcinia*, family *Guttiferæ*, is also used. It is powdered and placed over the fire, and applied hot to patients suffering from inflammation, as it quiets the nerves and relieves the pain in the joints.

The plant called busalas is likewise medicinal. Its leaves, when reduced to ashes and mixed with a little oil, will bring to a head any kind of an abscess, or, if these are already in the stage of suppuration, it will cause them to open and will cure them without trouble.

PLANTS USED IN PARTURITION.

An infusion of the leaves of the taraje (*Casuarina equisetifolia* Forst.), of the family *Casurinaceæ*, will cure chlorosis.

The leaves of the alagtayo or ticala, when applied to abdomen of a pregnant woman, will very quickly bring on parturition.

PLANTS USED AS ANTIDOTES.

According to the opinion of experts the manungal (*Samadera indica* Gaert.), of the family *Simarubaceæ*, is one of the best antidotes found in these islands. A solution made by boiling is given to anyone who has eaten poisoned substances, such as herbs or fish. The oil of manungal is admirable for curing all kinds of disorders of the stomach, as is likewise the infusion made from marbar or cayutana.

An infusion of the bark of the palagnigon is both an antidote and a febrifuge.

An infusion of the bark of the calasusi (*Plumeria acutifolia* Poir.), of the family *Apocynaceæ*, is an excellent mild purgative, or may be used as an emetic.

The bark of the root of the tree called bagosabac is curative for the bite of any kind of poisonous animal or snake.

PLANTS USED AS FEBRIFUGES.

The tree called tambalaguisa or mantala (*Sophora tomentosa* L.), of the family *Leguminosæ*, has at a certain season a number of little yellow flowers, and following them, long pods filled with seeds, somewhat like chickpeas. This fruit is a febrifuge having a very bitter taste. One or two of the seeds are given to those who suffer from certain malarial fever. The medicine is still more valuable for those having quartan. It is likewise an excellent stomachic. From these seeds an oil is also made which gives great relief to pains in the bones. It is also used for intestinal troubles and is a remedy for chlorosis. Another trailing plant having admirable qualities is called by the Tagalogs macabuhay and by the Visayans panglanan (*Menispermum rimosum* L.) It belongs to the family *Menispermaceæ*. It is very bitter and very useful for the stomach and the entire body.

The bark of the tree called dita (*Alstonia scholaris* D. C.), of the family *Apocynaceæ*, when treated with acidulated water, produces an alkaloid, ditain, which is employed in place of quinine for all kinds of fevers.

PLANTS USED AS DIURETICS.

An infusion of the leaves of the tree called polotan or uliñgon serves as an excellent diuretic. The juice of the bark or an infusion of it is likewise useful.

The palo-santo, called by the natives guicos-guicos, or hannadao, of the genus *Abrus*, family *Leguminosæ*, possesses admirable properties. It is an excellent remedy for spasms and chills, from which so many suffer in these countries. An infusion of this plant expels injurious humors from the body, does away with obstructions, regulates the stomach, and is of equal value with sarsaparilla for specific trouble. It is likewise a sudorific.

Naguini and languingi are trailing plants which cure muscular and nervous spasms, the leaves being applied as a plaster after being heated before the fire. The application is made under the arms.

PLANTS USED FOR VARIOUS MEDICINAL PURPOSES.

The pilpog is a most bitter medicine. It is useful as a stomachic, and simply chewed and swallowed serves to cure any kind of pain. It is likewise an antidote, and in the form of an infusion is a febrifuge useful in tertian and quartan fevers.

Among all the trailing plants found in these islands that which is of greatest importance and most esteemed is called by the natives igasud (*Strychnos ignatii* Berg.), of the family Loganiaceæ. The Spaniards, taking up the name which was given to it by the missionaries in the Visayan Islands, call it the pepita of San Ignacio. It abounds in all the mountain regions of Visayas, but is not found in Luzon. When full grown it is of considerable size, the fruit at times being as large as a pomegranate, though a little longer. It has a hard shell, within which is a yellowish or slightly reddish meat, and in this is found the seed so highly esteemed in all parts of the world. These seeds are grown principally near Catbalogan. They are used for persons who have eaten something poisonous, in which case a little piece is eaten and immediately followed by a drink of cold water, the poison thus being expelled. So, too, taking it in this manner it cures disturbances of the stomach or intestines. It is likewise useful for paralytics and for women during parturition. Grated or in the form of powder it is much used as styptic. Grated and given with water at the beginning of the chilly stage will often prevent an attack of malarial fever. It is also useful for the bite of the caterpillar called basut, when applied as a powder over the affected place. It is used also as an emetic. Held in the mouth and sucked, it is useful for rheumatism. So, too, it relieves indigestion. The oil remaining after pieces of this seed have been fried is useful for contractions of the nerves and pains in the body.

There are many other medicinal plants in the Philippines, as may be seen by consulting the General History by P. Juan J. Delgado, S. J., published in Manila in 1892, and others.

CHAPTER IX.

FRUIT TREES.

Philippine fruit trees in general do not produce such exquisite and highly prized fruits as do those of Europe. As both wild fruit trees and cultivated ones are very abundant, only the best-known ones will be spoken of; some mention will be made of their probable origin, arranging them according to the families to which they belong.

ANACARDIACEÆ.

Among the Philippine species of this family is the mango (*Mangifera indica* Linn.), which is believed to come from Macao, and which grows well in the provinces of Manila and Cavite, and also in the Visayas. The fruit season begins in April. The fruit has a delicate flavor and an aromatic odor, the largest of them being from 6 to 7 inches in length; in shape they are flattened, not round; the skin is yellow and rather fine; the pit, which lies in the center of the fruit, is almost as long as the fruit itself, but very narrow. The plant springs from this seed. The leaves are long and wide and dark green in color; an infusion of these is somewhat similar to tea. Besides this species the following are found: Manga de anis (*Mangifera fragans* Malinay) and manl (*M. costa* Jack), which is found in Mindanao, of Asiatic origin; casuy (*Anacardium occidentale* L.), of American origin; siruelas (*Spondias purpurea* L.), from southern Asia; albudhod (*Spondias mangifera* Wild), found in Panay, also of Asiatic origin.

The mampon on pajomanga (*Mangifera altissima* Blanco).—This fruit is very similar to the mango, and when ripe is quite delicious. It is frequently preserved in brine in the form of pickles, and is very healthful; it is likewise made into sweetmeats and preserves. There are other small varieties of this kind about the size of an olive, which are used in making pickles and preserves.

ANONACEÆ.

Among this family is found the anona (*Anona reticulata* L.). It is an exotic from Mexico, its flesh being white and containing small, black pits. It is sweet and fragrant.

ATES (*ANONA SQUAMOSA* L.).

The fruit is juicy and aromatic, very sweet, and so soft that it seems to melt in the mouth; it is somewhat peppery. Another species found is Guanabano (*Anona muricata*). All three species come from America.

EBENACEÆ.

But one species of this family is indigenous to the Philippine Archipelago, the mabalo (*Diospyros discolor* Willd), whose reddish fruit, about the size of a quince, contains a large seed; the flesh is white and sweet, but somewhat indigestible and has a rather strong odor. The sapote (*Diospyros ebenaster* Retz.) and the pagapat (*Diospyros kaki* L.) are natives of China.

GEBANIACEÆ.

Of the American family there are two species, the balimbing (*Averrhoa carambola* L.), which has the flavor of a quince, and the camias (*Averrhoa bilimbi* L.), whose fruit when green has an agreeable, sour taste, but when ripe is sweet and fragrant.

GUTTIFERÆ.

Of this family the mangosteen (*Garcinia mangostana* L.) is found. It is an exotic, and grows only in Jolo and some points in the district of Zamboanga and Cotabato. It is called there the "king's fruit," because it is so highly prized by the Moro sultans. It is dark red or purple in color and about the size of an orange. The edible and juicy parts of the fruit form small white divisions, very soft, which are found in the interior; they are covered with a double skin, reddish in color, and which must be removed before the fruit is eaten. The fruit is sweet and very delicate in flavor. Its origin is the Indian Archipelago.

MELIACEÆ.

In this family is found the lanzon or boboa (*Lansium domesticum* Jack). The tree is beautiful in appearance and gives a cool shade; the leaves are a beautiful clear green; the skin of the fruit is a clear yellow, thin and fine; within it are contained five divisions, as in the lemon, but the flesh is crystalline white, almost transparent, sweetish sour, quite delicate, and very refreshing. Each fruit contains a pit, which is the seed from which the tree grows; it is more bitter than gall, but is not injurious, on the contrary it is something of a carminative. One may eat a hundred of these fruits without difficulty and without danger, for they are healthful and excellent for those who suffer from heat. Their origin is the Malay Archipelago.

Santol (*Sandoricum indicum* Cav.) is a large tree having leaves 6 or 7 inches long. The fruit is bitter-sweet in taste; it is used principally for preserves and pickles. Its origin is southern Asia.

MYRTACEÆ.

Macupa (*Eugenia malaccensis* L.) is a fruit about the size of a sweet pepper and of somewhat the same shape, rather larger and quite red in color; it is, however, more lustrous, being almost resplendent. It is bitter-sweet in taste, somewhat agreeable, but has no solid flesh which can be eaten.

Tampay (*Eugenia jambos* L.): This fruit is about the size of a small apple, the flesh being soft, sweet, and having an odor like roses.

Dubat or limboy (*Eugenia jambolona* L.): This produces a wild fruit, dark purple to black in color, about the size of an olive. It is likewise a native of the Malay Archipelago.

Guayabo (*Psidium guayaba* L.): This exotic plant comes from Mexico, but grows so well here that entire forests of it may be found. There are three principal varieties. The fruit is yellowish in color and very aromatic, as are

likewise the leaves. The interior of the fruit is filled with little, hard seeds or pits, which are embedded in the flesh. It is a carminative, and its astringent properties make it an excellent preserve. With simple sirup it is much used.

MUSACEÆ.

The banana is the most important of this family. In the Philippines there is a large number of species, varying greatly in their form and taste. The trunk of the banana tree is not solid, but soft and full of minute little tubes or aqueducts, which serve to conduct the sap which sustains and matures the plant within the short space of one year. Shortly after the fruit ripens the plant begins to decline and the leaves dry up and fall. The fruit grows in bunches of various shapes, according to the particular species. Important varieties are the saba (*Musa sapientum* L.), which is delicious and healthful when ripe; the hanipa, sweeter than the saba, and which is cultivated principally in Samar and Leyte; the tambonan, a very common and healthful species; the camada, very large; the binalatong, larger, more delicate, and more fragrant than the preceding; the tarip; the bungaran, rather indigestible; the putian; the torlangdato, called in Spanish "the lady finger;" the pitbitin, a small, sweet, and rich variety; the dariao, a good variety; the mungco, the talood, the tinumbaga, the dariyas, and others. P. Delgado enumerates and describes 57 varieties, as may be seen in his history.

CARICACEÆ.

Of this family there is but one Philippine species worthy of mention, the papaya (*Carica papaya* L.). There are two sexes, the male and female. The male does not produce fruit, only some tubes filled with small, white aromatic flowers; the female produces fruit. The tree is soft and yellow, looks somewhat like a palm, and has large, broad leaves; the fruit somewhat resembles a small squash in appearance. When it ripens, the skin changes from green to a reddish color, as does the flesh also. The fruit contains a number of seeds somewhat similar to squash seeds; it is sweet, refreshing, delicate, and pleasant to the taste. The tree is indigenous to America.

RUTACEÆ.

Of this family various oranges and lemons are found. Oranges of various indigenous species are found. The principal one is the cajel (*Citrus aurantium* var.). Another variety is the naranjitas (*Citrus aurantium*). There are several wild species, one of which is called "anumimtay" (*Citrus hystrix* DC.). They are very large, being 12 or 13 inches in circumference, having a thick skin, are very juicy and bitter.

There are more than seven varieties of lemons. The citron, which is very large, is also found in abundance.

SAPOTACEÆ.

The chico sapote (*Achras sapota* L.) and the chico mamey (*Lucuma mamosa* Gaert.) belong to this family. The fruit is about the size of an orange, green on the outside and black on the inside. It is sweet and agreeable and makes excellent preserves. It is a native of Mexico.

URTICACEÆ.

Belonging to this family is the nanga or langca (*Artocarpus integrifolia* Willd.). It has been claimed that the fruit of this tree is the largest found in the world, as some of them are as large as a good-sized water jar. The tree is large and thickly branched; the leaves are long and narrow. The fruit is produced alike from the branches and from the main trunk of the tree quite close to the ground, and even from the roots, this last being especially true when the ground is somewhat elevated. The ripening fruit is recognized by its aromatic and penetrating odor; the fruit is then cut. When opened along the middle it shows a large amount of yellowish or whitish meat, which is not edible, and a number of shells of a golden color each containing a seed. It resembles in sweetness the date, but it possesses an odor like musk. It is somewhat indigestible, but is quite nourishing. The seeds when boiled or baked

somewhat resemble the chestnut. The wood of the tree is yellow, solid, durable, and very serviceable for working. It is a native of the Malay Archipelago. Other species are figs (*Ficus carica* L.), from western Asia; the rima (*Artocarpus incisa* L.), from the Malay Archipelago; the dalangulan camansi (*A. camansi* Bl.), an indigenous plant, and the marang (*A. polyphema* Pers.), of Mindanao.

VARIOUS WILD SPECIES.

There is a large number of wild species of fruits found in the Philippines. They are in general sour, sweet, and somewhat carminative. Among these may be mentioned the doctoyan, the pananquan, the durion, the abuli, amahit, angiap, amaga, agononan, abubunanu, alanganisan, dæ amamampang, bonano, barobo or marobo, cabaan, carong, cagos, gayan, dalinson, etc., which are described by P. Delgado.

CHAPTER X.

VARIOUS VEGETABLE PRODUCTS.

ESSENCES OR ESSENTIAL OILS.

There are various trees in the Philippines from which these essences or essential oils may be extracted, but the only ones utilized are the ilang-ilang (*Cananga odorata* Hook); sampaguita (*Jasminum sambac* L.); champaca (*Michelia champaca*, L.).

Ilang-ilang (*Cananga odorata* Hook, *Unona odoratissima* Bl.).—This tree, belonging to the family Anonaceæ, produces ordinary looking flowers of a greenish color, but of great fragrance. The tree is utilized as a shade tree, and from its flowers, especially those of the mountain trees, a highly valued essence is extracted by distillation. This essence, called "ilang-ilang," has been popularized by the Parisian perfumers. This essence is exported in small quantities to France, England, Singapore, and China.

Sampaguita (*Jasminum sambac* L.).—Sampaguita is a plant belonging to the family Oleaceæ. From the white fragrant flowers a highly-prized essence is extracted by distillation by perfumers.

Champaca (*Michelia champaca* L.).—The champaca belongs to the family Magnoliaceæ, and is a tree about 4 meters in height, conical in shape. The flowers are very fragrant, and about an inch in length. It is much cultivated in gardens, but is not found in the mountains. By distillation a well-known essence is extracted from the flowers.

RESINS.

In the Philippines there is a large number of trees which produce resin. Some of these are used in medicine, some for illuminating purposes, others in the manufacture of varnishes, others in painting, and others for calking ships. The principal ones will be indicated by families:

Araliaceæ.—The ilmolimo (*Heptapleurum caudatum* Vid.) furnishes a resin used in the making of varnishes.

Burseraceæ (*Abilo*) (*Garuga floribunda* Decne.) produces a resin used in medicine. The antong or brea negra (*Canarium pimela* Kom) produces a resin used for illumination. The pill or brea blanca (*Canarium album* Bl.) produces a resin which is used for illuminating purposes and for calking ships. The papsalingin (*Canarium cumingii* Engl.) produces a resin used for the same purposes.

Coniferaæ.—The galagala or playo (*Agathis orantifolia* Salisb.) produces a resin which is used for burning, for lighting, and for the manufacture of varnishes.

Dipterocarpaceæ.—The apitong (*Dipterocarpus grandiflorus* Bl.) produces a resin used for illumination. Balao or malapaho (*Dipterocarpus velutinus* Bl.) produces a resin used for calking. The mayapas (*Dipterocarpus turbinatus* Gaert.) produces a resin similar to the preceding one, which is used for the same purposes. The duagling (*Dipterocarpus* sp.) produces a resin useful for illuminating purposes. The guijo (*Shorea guiso* Blume) produces a resin used for the same purposes as the preceding; as does the yacal (*Hopea plagata* Vid.). The resin from the lauan (*Anisopetala thurifera* Bl.) is used for burning, for the manufacture of varnishes, and for calking. The resin from the malaano-

nang (*Dipterocarpus* sp.) is used for calking. A resin used in medicine is obtained from the mayapis (*Dipterocarpus turbinatus* Gaert.), and one useful for lighting purposes is obtained from the paua (*Dipterocarpus vermicifluus* Bl.).

Euphorbiaceæ.—The resin from the alipata (*Ecacaria agallocha* L.) is used as a remedy for the bites of poisonous animals; taken internally it produces dysentery.

A medicinal resin is obtained from the birunga (*Macaranga tanarius* Muell-Arg.). The resin from the togocam (*Claoxylon wallichianum*, Muell-Arg.) is used for illuminating purposes and as a medicine.

Guttifera.—The binucao (*Garcinia* sp.) produces a resin used in medicine.

Leguminosæ.—The adyangao (*Albizzia procera* Benth) produces a resin used as an incense. A resin having medicinal properties is obtained from the catu-ray (*Scabania grandiflora* Pens.). A resin useful for illuminating purposes is obtained from the cupang (*Parkia roxburghii* G. Don.). Another resin used for the same purpose is obtained from the cogontoco (*Albizzia saponaria* Blume).

Melastomaceæ.—A resin used for illuminating purposes and for calking ships is obtained from the bota-bota (*Melastoma obvolutum* Jack.).

Rutaceæ.—A resin used for illuminating purposes is obtained from the cajel (*Citrus aurantium* L.), orange tree.

Sapindaceæ.—The balinghasay (*Buchanania florida* Schau.) is used for illuminating purposes and for calking ships. An illuminating resin is obtained from the ligas (*Semecarpus perrottetii* March.).

Urticaceæ.—A resin from the breadfruit or antipolo (*Artocarpus mircisa* L.) is used as a medicine and as a bird lime for catching birds. The resin from the ambling (*Artocarpus ovata* Bl.) is used for making varnish. The resin from the camansi (*Artocarpus camansi* Bl.) is used as a medicine and as a drier. Nangca (*A. integrifolia* Linn. f.) produces a resin used for illuminating purposes.

GUMS (ALMACIGAS).

In the Philippines the name of almácigas is given to most of the yellowish and aromatic resins. The most valuable ones are found in the Calamianes, while others are found in Mindanao, especially in Davao and in Ilocos.

GUM RESINS.

The principal trees which produce gum resins useful in medicine, painting, or the arts are:

Anacardiaceæ, the casay or balubad (*Anarcadium occidentale* L.), which produces a gum resin used in the manufacture of varnish.

Apocynææ, the dita (*Alstonia scholaris* R. Br.), which produces a medicinal gum resin, as do those of the species Laniti (*Wrightia*).

Euphorbiaceæ.—Medicinal resins are obtained from the bigabing (*Macaranga mappia* Mull. Arg.) and from the buta (*Ecacaria* sp.).

Guttifera.—The palomaria or bitao (*Calophyllum* sp.), the bitanhol (*Calophyllum wallichiana* Planch.), the gutagaby or tanglananac (*Garcinia morella* Derr.), and the gatasan-pula (*Garcinia venulosa* Choisy) produce gum resins used in medicine.

Leguminosæ.—Two gum resins used in medicine are derived from the aramo (*Acacia farnesiana* Willd.) and the narra encarnada (*Pterocarpus indicus* Willd.).

Myristicaceæ.—Medicinal resin is obtained from the duguan (*Myristica* sp.).

Palmeæ.—The bonga (*Areca catechu* L.) produces a resin used in medicine.

Rutaceææ.—The lucban or naranjo (*Citrus decumana* Murr.) produces a gum resin likewise used in medicine.

Urticaceæ.—The balete (*Ficus indica* Bl.) and the banyan tree (*Ficus* sp.) produce gum resins used in medicine.

Sapotaceæ.—The notac (*Palaquium* sp.) produces a gum resin used as a glue and for other industrial purposes.

GUTTA-PERCHA.

Gutta-percha is found in considerable quantity in Mindanao, and is produced from the trunk and branches of several trees, from those of the genera *Ficus* and *Palaquium*. This tree is called by the Visayans solonot. In collecting this it is not best to follow the plan used by the natives of cutting down the tree;

large trees only should be selected, and these should be tapped. Beneath this incision on the bark or the trunk a bombon or large tube of bamboo is placed to collect the supply. This product is then placed in a batea, or dish, where it is macerated with salt water, the dish being at the same time shaken. In this way the gutta-percha soon becomes solid; the water is then poured off and the gutta-percha is formed, while still plastic, into a plate or disk, but through the edge of which a hole is made, suspending it, and thus exposing it to the air, so that it may dry perfectly. This method produces gutta-percha of rather inferior quality.

A few years ago a considerable quantity of gutta-percha was exported to England, but on account of the many adulterations made by the Chinese merchants but little is now exported.

VEGETABLE WAX.

Many plants produce a certain amount of an oily material somewhat similar to beeswax. It is found sometimes as a deposit on the surface of leaves, fruit, or on the bark. This material is not of the same quality in all vegetables, although it has not been well studied. It is obtained from the palm (*Ceroxylon andicola*) and from the *Myrica cerifera*. It is found in the Philippines, in the Calamianes, in Paragua, and in some other parts. It is obtained from the trees by scraping the bark.

I. PRODUCTS OF THE ARCHIPELAGO.

Importance and Extent.

The chief source of wealth of the Philippines since their acquisition and partial civilization by Spain in the sixteenth century has been the production and exportation of agricultural commodities.

The soil of the islands consists mainly of decomposed volcanic rocks, enriched with decayed organic matter. When sufficiently watered it is extremely fertile, yielding luxuriant tropical and subtropical growths, either indigenous or exotic. The range of products is very wide; about 300 fiber plants of either commercial or local value are found in the different provinces, while food-producing plants grow in great variety and profusion, as well as plants yielding valuable gums, dyes, oils, and medicines. Tropical fruits, such as the banana, mango, orange, and scores of others are produced with slight or no effort, while corn, small grains, potatoes, tomatoes, and many other vegetables respond readily to cultivation.

The principal vegetable products of the islands are hemp (abaca), sugar, tobacco, copra, and rice. Formerly coffee was an important product and figured largely in the insular export trade; but within the last twelve years the coffee plantations have been devastated by insects and disease, and the cultivation of the berry has been reduced to very small proportions. Corn of American origin is largely produced. The camote (a species of sweet potato) is an important food product throughout the archipelago.

Nuts of many kinds are produced, including the betel nut, extensively used by the natives in a manner similar to that in which chewing tobacco is used in the United States, and the cocoanut, the most important of all, the dry kernels of which constitute the copra of commerce.

Spices of various kinds, such as pepper, cinnamon, cloves, and nutmegs, are found in different portions of the islands. Experiments have demonstrated that the ordinary vegetables and cereals of the United States can be successfully cultivated in many sections.

The products of the soil used for manufactures, export, or home consumption have been classified as follows:

Fruits and nuts.—There are many varieties, the principal of which are the banana, mango, cocoanut, and betel nut.

Fiber or textile plants.—Nearly 300 varieties, the more important of which are abaca, rattan or bejucu, ramie, agave or maguey, pineapple known as piña, cotton, and pandan.

Oil-producing plants.—The most important is the cocoanut palm.

Grains and grasses.—The principal varieties are rice, corn, bamboo, zacate (grasses of several kinds used as food for cattle and horses), and cogon.

Dye plants.—There are many varieties, of which indigo is the most important.

Starch plants.—There are several kinds, the arrowroot being the principal one.

Saccharine plants.—Sugar cane is largely cultivated.

Plants used for the production of alcoholic liquors.—Tuba and vino are largely manufactured, principally from the nipa or sasa plant, and from liquid gathered from the cocoanut and buri palm.

Medicinal plants.—There are many kinds

Aromatic plants.—The chief among these are tobacco, cacao, and coffee.

Gum and resin bearing plants.—Among these are rubber and gutta-percha trees and vines.

Plants from which essences or essential oils are obtained.—The ilang-ilang is the most important.

Vegetables.—An extensive variety is produced, including many garden vegetables commonly grown in the United States. The camote (sweet potato) is the most largely grown.

Extensive areas are devoted to pasturage, and the carabao, or water buffalo, the principal and most useful animal in the Philippines, is bred in large numbers, as well as other horned cattle of Indian or Australian origin, horses, hogs, sheep, poultry, and other animals.

The preponderating influence of agriculture is indicated by the following table, which shows, for the years specified therein, as far as can be gathered from existing available records, the combined values of the principal agricultural products exported from the islands, and the values of other exported products. The principal products to which the figures in the table relate consist of sugar, leaf and manufactured tobacco, raw and manufactured hemp (abaca), cocoanuts and coconut products (oil and copra), coffee, dyewoods, dry and liquid indigo. The per cents that these and other exports were of the value of all exports are also shown for each year covered by the table. The quantities and values of each of the above-mentioned commodities exported during the several years embraced by this table will be found in subsequent separate tables.

Detailed statistics for the period from January, 1896, to July, 1898, inclusive, are not obtainable; but the figures presented for each of the other years clearly demonstrate the prime importance of agricultural products and the comparative commercial unimportance to the islands of nonagricultural products.

Owing to lack of detail in classification in the Philippine customs records, it is impossible to indicate the years in which copra was or was not exported prior to 1890; and incomplete reports prevent the inclusion in the principal agricultural exports of certain products for some of the years covered by the table, as indicated by footnotes.

Values of principal agricultural and other exports from the Philippine Islands during each calendar year specified: 1854 to 1902.

Year.	Value of principal agricultural products exported.		Per cent of total value of exports.	Value of all other exports.		Per cent of total value of exports.	Total value of exports (dollars).
	Pesos.	Dollars.		Pesos.	Dollars.		
1854.....	5,031,451	5,329,313	79.21	1,330,897	1,399,064	20.79	6,728,407
1855.....	5,592,908	5,876,712	91.36	529,014	555,898	8.64	6,432,000
1856.....	8,150,144	8,564,171	89.24	983,173	1,033,119	10.76	9,597,290
1857.....	10,145,429	10,735,006	85.29	1,750,392	1,890,841	14.71	12,646,447
1858.....	6,572,334	6,906,272	69.79	2,844,361	2,989,085	30.21	9,895,357
1860.....	7,514,964	7,965,401	79.03	1,994,517	2,119,374	20.97	10,104,775
1861.....	6,444,102	6,763,085	79.90	1,621,322	1,701,089	20.10	8,464,774
1862.....	7,354,993	7,778,041	80.82	1,745,804	1,846,362	19.18	9,625,008
1863.....	8,534,380	9,019,133	84.86	1,522,488	1,608,712	15.14	10,628,045
1864.....	8,595,408	9,063,728	80.66	2,061,523	2,178,017	19.34	11,262,345
1865.....	16,148,423	16,978,452	77.14	4,784,194	5,090,102	22.86	22,008,554
1866.....	18,515,774	19,480,446	83.47	3,666,749	3,857,786	16.53	23,338,232
1867.....	19,677,272	20,533,233	89.41	2,329,532	2,430,867	10.59	22,964,100
1873.....	22,635,360	23,061,481	96.23	886,669	904,442	3.77	23,966,923
1874.....	15,765,217	15,830,942	91.05	1,547,760	1,555,189	8.95	17,386,031
1875.....	18,199,407	17,766,456	96.19	720,888	708,712	3.81	18,470,168
1876.....	14,095,615	12,893,168	96.00	742,281	678,964	5.00	13,572,132
1877.....	15,311,055	14,400,327	93.58	1,050,739	992,365	6.42	15,452,692
1878.....	15,887,689	14,400,492	90.94	1,562,736	1,434,492	9.06	15,885,084
1879.....	14,678,229	12,962,344	78.02	4,185,223	3,651,315	21.98	16,614,159
1880.....	21,641,217	19,472,767	92.29	1,809,068	1,637,799	7.71	21,100,566
1881.....	23,420,384	20,537,569	96.29	1,158,112	1,060,373	4.71	21,867,942
1882.....	19,956,146	17,806,369	96.53	717,187	639,946	3.47	18,446,815
1883.....	24,119,671	21,037,177	91.43	2,261,056	1,972,938	8.57	25,009,270
1884.....	17,480,632	15,066,318	76.09	5,192,201	4,740,379	23.21	19,827,392
1885.....	20,871,884	17,423,515	85.00	8,632,201	3,073,901	15.00	20,497,416
1886.....	18,672,314	14,594,281	72.60	7,048,718	5,509,278	27.40	20,103,559
1887.....	22,968,362	17,676,451	90.94	2,288,777	1,761,443	9.06	19,437,894
1888.....	25,335,942	18,706,383	96.35	959,329	732,368	3.65	19,414,951
1889.....	32,766,676	24,076,954	93.81	2,160,293	1,587,393	6.19	25,664,337
1890.....	23,104,061	18,996,151	88.14	3,109,503	2,556,633	11.86	21,552,784
1891.....	24,923,048	19,347,762	92.63	1,982,064	1,538,669	7.37	20,886,431
1892.....	27,205,569	18,630,367	97.24	771,010	527,967	2.76	19,158,354
1893.....	34,536,225	21,174,160	95.21	1,739,341	1,066,390	4.79	22,240,550
1894.....	31,580,173	15,762,190	96.26	1,569,811	783,022	4.74	16,535,212
1895.....	28,979,300	14,862,462	79.06	7,676,427	3,944,916	20.94	18,837,378
1896.....		14,862,462	96.07		203,027	3.93	5,165,395
1899.....		14,183,438	95.55		660,144	4.45	14,846,582
1900.....		21,159,718	92.04		1,830,655	7.96	22,990,373
1901.....		22,854,974	93.27		1,648,379	6.73	24,503,353
1902.....		27,390,475	95.43		1,311,429	4.57	28,701,904

* Five months—August to December, inclusive.

† Not including cocoanut oil, dyewoods, and indigo, the values of which are included with those for "all other exports."

‡ Not including cocoanut oil and dyewoods, the values of which are included with those for "all other exports."

In addition to the principal products, the combined values of which are given in the above table, other products of the soil, such as vegetable oils other than cocoanut oil, nuts of various kinds other than cocoanuts, rice, fruits, plants, seeds, vegetable fibers other than hemp, and forest products of different kinds, were exported from year to year in quantities and of values too small to be of importance. The relative commercial importance of these products is evidenced by the fact that, with slight exceptions, the value of each was considerably less than 1 per cent of the total value of exports during each year for which statistics are obtainable.

It may be thought that sugar (a factory product) and other products that have undergone processes of manufacture, more or less extensive, should not properly be included in the above table as agricultural. While it is true that sugar is a manufactured article, it is so closely identified with and allied to agriculture, particularly in the Philippines, where the sugar is largely produced by primitive methods and is mostly of very low grade, that its classification as an agricultural product is thought to be justified. The same is true, though to a less extent, of manufactured tobacco.

In the absence of definite statistics regarding the production of tobacco, a large proportion of which is consumed in the islands, it would be impossible to indicate the relative importance of the crop without taking into consideration the value of both the leaf and the manufactured tobacco exported. It may also be said that in the Philippine Islands the difference in value between leaf and manufactured tobacco is not nearly so great as in other sections of the world, the element of labor, in which such difference principally consists, not being as important a factor there as elsewhere in computing values, because in the tobacco-manufacturing industry wages are much lower relatively than in America.

Manufactured hemp (principally cordage), cocoanut products (oil and copra), and dry and liquid indigo are also included as being primarily agricultural products and as having an important bearing on the industry in question, notwithstanding the fact that they have passed through manipulative processes.

[From census of P. I. 1903, v. 4, p. 117.]

Miscellaneous Products.

In addition to the soil products of which special descriptions have been given, certain food and other plants, some of which have been hereinbefore mentioned, are quite extensively grown for domestic use and in a few instances to a slight extent for export, the principal ones of which are briefly described as follows:

Maize, or Indian corn (*Zea mays* L.), brought to the islands from America by Spaniards, is cultivated quite generally throughout the archipelago, and in a few districts is the staple food instead of rice. As in the United States, it is used principally as a food for live stock, the leaves and stalk being utilized for this purpose as well as the grain. When planted in good land it gives two, sometimes three, crops per year, each crop yielding about two-hundredfold. In the Visayan Islands the grain is used to some extent in the making of an alcoholic beverage called *pangast*.

Zacate, which includes grasses of various kinds suitable for forage for live stock, especially horses, is carefully grown, particularly near Manila and other centers of population, and yields good returns to the farmers, who gather several crops per year from each field. The species grown about Manila is *Leersia hexandra*. The grass is not cured but is packed in small bundles as soon as cut and sold to consumers for immediate use in its green state.

Teosinte (*Euchlaena luxurians*), recently introduced into the islands, is a highly valuable annual grass, with very numerous stems from 6 to 12 feet tall, of which as many as sixty or seventy sometimes grow from a single seed. The stalk, leaves, and spindle resemble Indian corn.

The following description of this valuable forage grass, its cultivation, and the results of experiments in its culture, is furnished by Prof. F. Lamson-Scribner, chief of the insular bureau of agriculture:

"This is the plant of which Prof. Asa Gray said, 'Possibly affording an opportunity for one to make millions of blades of grass grow where none of any account grew before.' At the experiment stations of Louisiana, Mississippi, Georgia, and Florida it has given the heaviest yields of any of the forage crops grown, Georgia reporting 38,000 pounds of green forage per acre, Mississippi 44,000, and Louisiana the enormous amount of over 50 tons. It needs a long

season of hot weather, a rich soil, and abundant moisture in order to succeed well, and it is useless to plant it where all these conditions can not be had. It is a remarkably vigorous grower, reaching 10 to 12 feet in height, with an unusually abundant supply of leaves and tender stems. The seed should be planted in hills 4 feet distant each way, at the rate of 2 pounds per acre."

Experiments made by the insular bureau of agriculture have demonstrated the adaptability of this grass to the Philippines, as indicated by the following account:

"From the table given below it will be seen that five cuttings were made from the plot in eight months, which is equivalent to nearly eight cuttings a year. The total yield of the five cuttings is 49½ tons green and 10½ tons dry fodder per acre, or at the rate of 80 tons green and 16½ tons cured fodder per acre for the year. It is only fair to add here that the above figures are very low estimates. The second and third crops were damaged fully 50 per cent by locusts, and the four crops were obtained during the dry season, which was of unusual severity. This experiment shows that on well-fertilized land with frequent irrigation ten crops can be grown in one year, with a yield of 135 tons green and 30 tons dry fodder per acre.

"The following is a record of the yield and dates of cutting:

Date of cutting.	Height.	Yield per acre.	
		Green.	Dry.
	Feet.	Tons.	Tons.
March 21.....	5	12	2
April 20.....	2½	5	1½
May 18.....	2	4	1
June 29.....	5	12½	2½
August 10.....	6	16	4
Total.....		49½	10½

"The high price of teosinte seed and the great demand for it in the islands suggests the advisability of growing a small area for seed purposes. The plot produced at the rate of 800 pounds of thoroughly cleaned seed per acre. At 60 cents gold per pound (the wholesale price of seed in the United States) the value of the crop from 1 acre is \$480. Three crops of seed can easily be grown on the same ground in one year, which would mean a return of \$1,440 per acre.

"Two acres of teosinte were planted June 6. Owing to the dry weather prevailing at that time the seed did not germinate until June 20. Previous to planting, the land was fertilized with 40 cords of stable manure to the acre, which was plowed under. Only two cultivations were given, the first on June 29 and the second on July 7, at which time the teosinte was large enough to completely shade the ground. On August 10, one-tenth of an acre was cut, and yielded 3,440 pounds of green fodder, or at the rate of a little over 17 tons to the acre. At the time this plot was cut the average height of the teosinte on the 2 acres was 6 feet. Five days later, August 15, another tenth acre was cut, yielding 5,395 pounds, or at the rate of nearly 26½ tons to the acre. This tenth of an acre was cut near the center of the field and may be taken as a fair average for the 2 acres. On August 19 the teosinte averaged 8 feet in height. The crop is being sold as fast as cut at \$10 gold per ton. This gives a return of \$265 gold per acre for each cutting. Allowing eight cuttings per year, which have been obtained here on a smaller area, the gross receipts, at this rate, from 1 acre would be \$2,120 gold per year."

Cogon (*Imperata koenigii*) is a species of grass of general natural growth the young shoots of which afford excellent food for cattle. The grass is used in some localities as a substitute for nipa, where the latter does not grow, in thatching roofs. The name "cogon" is applied to many coarse, rank-growing grasses.

Sorghum (*Sorghum vulgare*), locally known as *batad*, is cultivated to some extent as a forage plant, and a considerable number of other varieties of useful gramineous forage plants grow in the mountain pastures and elsewhere in the islands.

Bamboo (*Bambusa*), several species of which grow luxuriantly throughout the archipelago. They are used for many purposes, principally in the construction of native houses, the frameworks of which are, as a rule, made almost wholly of these giant grasses. The bamboo poles used in house building

are tied together and held in position by rattan (*befuco*) and are thatched with cogon or nipa. The floors of the houses are usually of bamboo, and the posts, doors, window shutters, etc., are of the same material. These native houses are quickly and inexpensively erected by the natives, who are expert in their construction. Bamboo is also used for many other purposes, such as the making of boats, rafts, bridges, aqueducts, scaffolding, furniture, baskets, utensils of various kinds, fishing apparatus, weapons, rope, etc., while from finely separated filaments of bamboo, hats, cigar cases, and other articles are woven. The most useful variety of bamboo is that known as *Cauayang totoó*, which sometimes attains a diameter of over 20 centimeters and a height of more than 12 meters.

Nipa or *sasá* (*Nipa fruticans*) is a species of palm, having the appearance of a large fern, which grows only in marshy or muddy localities. It is indigenous to the coast, but is largely cultivated in places where there are marsh lands and is a highly useful plant.

It grows to a height of about 4 meters, and from its short stem arise large clusters of long compound leaves, which are used, wherever procurable, for thatching the roofs of dwelling houses. Sometimes churches and other public buildings are thatched with this material, and it is frequently used in the walls and partitions of the native houses.

From the sap or *tuba* extracted from the palm a liquor known as nipa wine, *vino*, or *bino*, is extensively distilled, which is used to a great extent by the people as a beverage. Large groves of nipa are grown in many localities for the sole object of producing tuba for purposes of distillation.

The nipa groves are started by planting the ripe fruits of the palm, usually between May and August, in holes placed about 1.7 meters apart; the frequent rains occurring at this season of the year usually keep the ground sufficiently wet to cause the seed to germinate and start a healthy, vigorous growth. Five or six years' growth is required before a nipa grove becomes serviceable.

The fruit of the plant grows in close-lying clusters at the end of a thick peduncle arising from the base of the palm; an incision is made in the peduncle immediately below the fruit and the sap flowing therefrom is collected in bamboo tubes hung to the plant, into which it drips. The incision is renewed and the sap collected daily for about ten months, the average production per plant being about 46 liters each season. The sap is emptied from the bamboo tubes into larger receptacles, in which it is carried to the distilleries. It is customary for the owners of large groves to give their workmen one-half the tuba they collect as remuneration for their labor. Fermented tuba makes a fairly good and largely used vinegar.

Cotton (*Gossypium herbaceum* L.), of long-staple variety, was formerly grown rather extensively in Ilocos Norte and a few adjacent provinces, but its cultivation was discouraged by the government in order to encourage growing of tobacco. The industry still exists, however, on a greatly reduced scale, and will probably hereafter increase.

A species of tree cotton (*Ceiba pentandra*) is found growing in a wild state in many of the islands; the cotton is useless for spinning purposes, the staple being very short, but it is used for making cushions and other articles.

The *pineapple* (*Ananas sativus* L.), of American origin, is cultivated in the Philippines, particularly in some of the Visayan Islands, more for the sake of the fiber found in its leaves than for its fruit, the latter not being very highly prized.

In order to obtain the greatest possible quantity of fiber, the young fruit of the plant is cut away, so that the leaves may grow longer and broader than they would otherwise; when the leaves are well developed they are torn from the plant and scraped with a fragment of glass or a sharp instrument, so as to remove the pulp from the fiber, which, when thus extracted, is washed, sun dried, and combed. The fiber is classified according to fineness and is woven into fabrics of exquisite beauty, very rough and primitive hand looms being used for the purpose.

Agave (*Agave vivipara* L.), or maguey, is another plant of American origin that is cultivated on a small scale in some parts of the Philippines, from the fiber of which a cloth called *nipis* is woven. The fiber itself has been exported in bulk to Europe, China, and Japan for many years.

Rattan (*Calamus*, Sp.), locally known as *befuco*, is found throughout the islands in many varieties. It is a climbing plant, which sometimes attains a length of 200 meters, and is of great use to the natives, who employ it in binding the frameworks of their houses together. It is also used as rigging

in small boats, in the construction of rafts, and for almost any purpose for which rope might be used. In some of the provinces hats and bagging, as well as chairs and other articles of furniture, are made of rattan.

Pandan (*Pandanus spiralis* Bl.), *buri* (*Corypha umbraculifera*), and *nito* (*Lygodium scandens*) are plants which furnish material largely used in the making of hats, sacks, and mats in different parts of the islands.

The buri palm is second only to the cocoa palm in the variety and usefulness of its products. The tree is not planted, but grows luxuriantly in many sections, birds being the sowers. It bears abundant crops of edible fruit, which is consumed by the natives, both raw and preserved in sugar. From the flowering-bud tuba, a highly prized beverage is extracted daily for a period of three or four months, more or less, after which the palm dies. From the tuba, vinegar is made; when fermented and mixed with the bark of the bacauan, it becomes a beverage called *basi*, which is very much relished by the people living on the island of Marinduque. When it is distilled an alcoholic liquor similar to that produced by distilling tuba extracted from the cocoa palm is obtained. When permitted to evaporate, a very fine syrup and sugar is formed. The young, tender leaves are used for making cloths. From the petioles of the leaves *buntal* is obtained, from which hats are made. The leaves are also used for making mats, sacks, and heavy wrapping material, and when boiled in water and bleached in the sun, are used in making a very fine quality of hats. From the trunk of the tree a starch food is extracted, as described on page 694. The variety and usefulness of its products render the buri palm one of the most valuable plants in the Philippines.

The hundreds of other fiber plants produced in the islands are not used sufficiently to justify their special mention; nevertheless many of them are very useful, and would undoubtedly prove of great value were they systematically produced and utilized.

The *camote* (*Ipomœa batatas*, Lk.), a tuber, is, aside from rice, the most widely grown and important food plant in the islands. It is a species of sweet potato, believed to have been brought from America. Leguminous plants are not as a rule extensively grown, though the *mongo* (*Phaseolus mungo*, Bl.), is cultivated on a considerable scale in some localities where it forms the principal food of the people. It is similar to but smaller than the lentil, and has the same flavor. The *butingui* (*Phaseolus vulgaris*, L.), or kidney bean, the *zabache* (*Phaseolus lunatus*, L.), the *sitao* (*Dolichos sesquipedalis*), the *frijol* (*Phaseolus lunatus* variety), and the *patani* (*Phaseolus lunatus* variety), and various other kinds of legumes are cultivated to a small extent and furnish vegetables and edible seed more or less highly esteemed.

The *gabe* (*Colocasia antioquorum* variety) is a plant the root of which is highly prized and extensively cultivated, especially in mountain districts; both the large roots and leaves afford excellent food. The *baidang*, grown principally in the Visayan Islands, is used in the same way as the gabe. Various other plants yielding edible roots are cultivated or grow spontaneously among which are the *ube* (*Dioscorea alata*), *tuque*, or *tugue* (*D. sativa*, L.), the *paquit* (*D. divaricata* L.), the *namiconot* (*D. pentaphylla*, L.), and the *tongo* (*D. papillaris*, L.), all of which have large roots. The tuque and ube are the most highly prized. Ordinary garden vegetables are cultivated in the Philippines to a very limited extent. There are gardens near Manila and other centers of population, managed principally by Chinese, but the natives scarcely ever engage in their culture. That nearly all vegetables grown in the United States can be produced in the islands has been demonstrated, and their production will undoubtedly increase as time passes and the wealth and population increase.

Among those cultivated are Irish potatoes, onions, garlic, asparagus, radishes, cabbages, artichokes, endives, peppers, tomatoes, carrots, celery, parsley, squashes, and melons of different kinds, cucumbers, and a few native vegetables that are prized on account of their flavors and food values.

Of oil producing plants there are several kinds, in addition to the cocoa palm of which an account has already been given. Among these may be mentioned the sesame or *ajonjolí* (*Sesamum orientale*, L.), which yields *benne seed*, from which an oil is obtained somewhat similar to olive oil, which it is frequently used to adulterate. It can also be used in making soap, and the residue left after the oil is extracted is an excellent food for cattle. This plant is not as extensively cultivated as its merits justify.

The *lumbang* (*Aleurites moluccana*, Blume), plant is cultivated on a small scale, and its seeds yield an oil useful as an illuminant, for painting, for calking ships, and other purposes. After the oil has been extracted from the seeds

the refuse is generally used as a fertilizer. The oil is exported in small quantities to China.

The castor oil plant (*Ricinus communis*, L.), is grown for its seeds, which produce an oil useful for medicinal and lighting purposes. A reddish illuminating oil is also extracted from a tree known in northwestern Luzon as *tavatawa* (*Jatropha curcas*, L.), to the Tagalogs as *tuba*, and in Iloilo as *casta*.

The peanut (*Arachis hypogæa*, L.), locally known as the *mani* or *cacachuete*, is an oil producer of great value, but is cultivated in the Philippines on a small scale only, and is principally used as forage for cattle.

The dye plants most extensively produced and utilized in the islands in addition to indigo are the *sibucan* or *sapang* (*Caesalpinia suppan*, L.), from the wood of which a red coloring matter similar to logwood is secured; the safflower *alazor* or *catsumba* (*Carthamus tinctorius*, L.), known locally as *biri* from the flower of which yellow and red dyes are obtained; the *agusip* (*Malasotoma imbricatum*, Wall.), and the *bancudo* or *bancoro* (*Morinda bracteata*, Roxb.), a bright red coloring matter being derived from the bark of the first named and the root of the latter; the *bacauan* (*Rhizophora mucronata*, Lam.), the bark of which yields a reddish dyestuff; the *balanti* (*Homalanthus fastuosus*, F. Vill.) and the *cunilon* (*Diospyros cunilon*, A. D. C.), whose bark furnishes a black dyestuff; and the *salticican* (*Morinda umbellata*, L.), from whose roots a red coloring matter is extracted.

Among starch-producing plants are the *cassava*, or *yuccu* (*Manihot utilisima* Pohl.), called in the Philippines *camoteng cahoy*; the arrowroot or *maranta*, locally known as *tagbac-tagbac*; and several varieties of palms, the most important of which is the *buri* (*Corypha umbraculifera*), which is famed throughout the archipelago. The island of Burias acquired its name from this growth, which is very abundant there. The starch from this tree, commercially known as *sago*, is obtained by cutting down the tree at the root and taking out the soft interior portion of the trunk, which is placed in casks or troughs and the bitter sap drained off. It is then subjected to a pounding with paddles or mallets which separates the starch into fine grains. The starch is gathered and dried and converted into flour. It is a palatable, nutritious food; and in Burias, Bohol, Masbate, and other sections where it is produced in abundance, largely takes the place of rice as a food stuff. The natives extract the juice from this plant by making an incision in the fruit, from which a beverage is made. Other varieties of starch-producing palms are the *bagsang* (*Caryota rumphiana* Mart.), which is quite common in the Visayan Islands; the *lumbia* or *lumbay* (*Metroxylon silvestre* Mart.), the *caucong* (*Arenga saccharifera* Labill.), and the *pagahan* or *baugan* (*Caryota urcus* L.), from each of which the starch is obtained from the heart of the tree trunk.

The putmeg (*Myristica fragrans* Houtt.) grows naturally in Cebu and the Province of La Laguna, and can be made to grow by cultivation in most sections of the islands. Cinnamon of superior quality is found growing spontaneously in widely separated sections of the island of Mindanao, and on some of the other southern islands; black pepper (*Piper nigrum* L.) is also found, and is cultivated to a slight extent.

The *ikmo* or *betel* (*Piper betel* L.), is a climbing plant, cultivated with much care in every province. The leaves are used in preparing the chewing mixture called *buho*, as follows: A leaf is coated with lime, or a small piece of lime is placed in it. It is then folded, and wrapped around a slice of the nut of the *arica palm*, known as the *betel nut*, which is also extensively grown. The leaf of the *buho de anis* is also sometimes used in connection with that of the *ikmo* in preparing *buho*.

The natives are in the habit of chewing the *buho*, which they claim is healthful and beneficial, though this is a matter of doubt. After having become addicted to the habit of *buho* chewing, it is said to be as difficult to cease using it as it is for those accustomed to using opium or tobacco to abandon their use. The *buho* chewing habit is general in the Philippines with both males and females.

No attempt will be made in this report to enumerate the large number of medicinal plants found in the islands. Many of them thought to be of value are of doubtful utility, while others of possible great value have not been fully identified and classified, so that any list of such plants that might be given would not only be faulty, but possibly misleading. It may be said, however, that the botany of the islands is extremely rich in an enormous variety of plants possessing beneficial properties, among which it is believed remedies may be found adapted to many kinds of human ailments.

Fruit.

Fruits, both wild and cultivated, abound in great variety in the Philippines, some of them being of superior quality, although, as a rule, their flavors are not equal to those of American fruits. Under proper horticultural methods, with the favorable soil and climatic conditions prevailing in the islands, their quality will improve, and those that are now deemed somewhat inferior will equal or surpass similar fruits grown anywhere in the world. Certain fruits have been recently introduced from the United States, such as grapes, blackberries, figs, and strawberries, and have grown and developed perfectly in the province of Benguet.

A descriptive list of the best known and most generally used Philippine fruits is given in "El Archipiélago Filipino," published by the United States Government in 1900, upon which the following description, given in the "Pronouncing Gazetteer and Geographical Dictionary of the Philippine Islands" (published by the Bureau of Insular Affairs, United-States War Department, in 1902), is based:

ANONA (*Anona reticulata* L.). An exotic from Mexico, its meat being white and soft, and containing, like the ates, small, black pits; is sweet and fragrant, and has an exterior appearance resembling the common custard apple or bullock's heart.

ATES (*Anona squamosa* L.). Juicy, aromatic, very sweet, very soft, and somewhat peppery; a table delicacy.

BALIMBING (*Averrhoa carambola* L.). Has the flavor of a quince, and is used by the natives as food with dry fish or meat.

BANANA. The commonest and cheapest fruit in the Philippines, there being a large number of species, varying greatly in form and taste. It is called *platanó* by the Spaniards, and *saging* by the Tagalogs. The trunk of the banana tree is not solid, but soft and full of minute little tubes or acqueducts, which serve to conduct the sap which sustains and matures the plant within the short space of one year. Shortly after the fruit ripens the plant begins to decline and the leaves dry up and fall. The fruit grows in bunches of various shapes, according to the species. Important varieties: *Lakatán*, very similar to the ordinary American banana; *latundan*, less yellow and sourer than the preceding, being noted for its digestive qualities; the *saba*, which makes a most delicious fritter; the *hanipa*, sweeter than the saba, and cultivated principally in Samar and Leyte; the *tambonan*, a very common and healthful species; the *camada*, very large; the *tundoc*, also large, the skin of which is of a violet color; the *binalátong*, larger, more delicate, and more fragrant; the *torlangdato*, called in Spanish "the lady finger;" the *pilitin*, a small, sweet, and rich variety; the *tarip*, the *bungaran*, the *putian*, the *dariao*, the *mungco*, the *talood*, the *tinumbaga*, the *dariyas*, the *bungulan*, the *gloria*, and others. P. Delgado enumerates and describes 57 varieties.

CAMIÁS (*Averrhoa bilimbi* L.). When green, has an agreeable sour taste, but when ripe is sweet and fragrant; is often pickled or candied, and its juice removes the stain of iron rust and other spots from linen.

CANTALOUPE. Of excellent varieties, especially in the provinces near Manila.

CHICO. Two varieties; the *chico sapote* or *sapote* (*Achras sapota* L.) and the *chico mamey* or *chico* (*Lucuma mammosa* Gaert.). The sapote is an evergreen tree, with thick shining leaves and milky juice; a native of tropical America. Its fruit is about the size of an orange, green on the outside and black on the inside, sweet, and makes excellent preserves. The chico is smaller, the skin and pulp of deep brown, with brilliant black seeds embedded in it. It contains a pleasant-flavored pulp resembling quince marmalade in appearance and taste.

CITRON. Fruit very large; is found in abundance.

DUHAT (Lombay) (*Eugenia jambolana* L.). A tree of hard and durable wood; produces a wild, edible fruit, dark purple to black in color, about the size of an olive. Its astringent bark is used in dyeing, tanning, and in medicine.

GUANÁBANO (*Anona muricata* L.). Pear-shaped, being similar in exterior appearance to the pineapple, containing an agreeable, slightly acid pulp; used for preserves.

GUAYABA (*Psidium guayaba* L.). A Tagalog bayabas; when ripe is of yellowish color, and very aromatic, as are the leaves. The pulp is acid, and has different color, according to the varieties, white, yellow, and pink. The

interior is filled with little hard seeds or pits, which are embedded in the meat. It is a carminative and an excellent jelly and marmalade. Natives use this fruit as food.

LANGCÁ or MANGCA (*Artocarpus integrifolia* Willd.). Is perhaps the largest found in the world, some as large as a good-sized water jar. The ripening fruit is recognized by its aromatic and penetrating odor. The fruit cut shows a large amount of yellowish or whitish meat, of which preserves and sweetmeats are made, resembling the date, with an odor like musk. The seeds when boiled or baked resemble the chestnut. The wood of the tree is yellow, solid, durable, and very serviceable for working.

LANZONE (*Lansium domesticum*) Jack or Boboa. Is beautiful in appearance and gives a cool shade. The leaves are of a beautiful clear green. The fruit is a yellow berry, the skin being bitter, thin, and fine. Within it are contained fine divisions, as in the lemon, but the flesh is crystalline white, almost transparent, sweetish sour, quite delicate, and very refreshing. This fruit is healthful for those who suffer from heat. The best kind of lanzones grow in La Laguna, Luzon.

LEMONS. Seven varieties of this fruit, some of superior quality.

MABOLO (*Diospyros discolor* Willd.). Is about the size of a quince and contains a large seed. The skin is reddish and velvety. The flesh is white and sweet, but somewhat indigestible, and has a rather strong odor.

MACUPA (*Eugenia malaccensis* L.). About the size of a sweet pepper and of somewhat the same shape, rather larger and quite red in color; more lustrous; bittersweet in taste, somewhat agreeable, but has no solid flesh which can be eaten.

MAMPÓN or PAJO (*Mangifera altissima* Blanco). Very similar to the *manga*, frequently preserved in brine in the form of pickles; also made into sweetmeats and preserves. There are other small varieties about the size of an olive, which are used in making pickles and preserves.

MANGA (*Mangifera indica* L.). One of the most exquisite fruits in the world, and the queen of the Philippines. The largest is from 6 to 7 inches in length; flattened. The skin is yellow and rather fine; the interior a fleshy, fibrous drupe, but sweet and delicate. The pit in the center is almost as long as the fruit itself, but very thin. The leaves are long, wide, and dark green, and an infusion of them somewhat resembles tea. The *manga* is used as a food, not only when ripe (April), but when green. It is used also for preserves, jelly, and marmalade. The natives make the boiled *manga* into a kind of relish of sweet-acid flavor, as palatable as the Indian chutney. The best mangas come from Imus, Cavite, Luzon.

MANGOSTEEN (*Garcinia mangostana* L.). An exotic fruit, grows only in Jolo and some points of Zamboanga and Cotabato, where it is called the "king's fruit," because it is so highly prized by the Moro sultans. It is dark red or purple, and about the size of a small orange. The edible and juicy parts form small, white divisions; very soft; found in the interior; covered with a double skin, reddish in color, and which must be removed before the fruit is eaten. The rind of the fruit, as well as the bark and wood of the tree, is very astringent, and has been used in medicine.

ORANGES of various indigenous species are found. The principal is the *cafel*. Another the *naranjita*. There are several wild species, one of which is called *amumintay*. They are very large, being 12 or 13 inches in circumference, have a thick skin, are very juicy and bitter.

PAPAYA (papaw) (*Carica papaya* L.). Two sexes. The male produces panioles of small, white, aromatic flowers; the female yields fruit. The tree resembles a palm, with large broad leaves. The fruit resembles a small squash in appearance, is ordinarily 10 inches long, commonly of an oblong form, ribbed, with a thick, fleshy rind, and sweet. When it ripens the skin changes from green to a reddish or yellowish color, as does the flesh also. It is sometimes eaten raw or made into a sauce, or when green is boiled as a vegetable and pickled, in combination with red peppers, spices, radishes, and onions, forming a nice hors-d'œuvre, with a yellow sweet-acid sauce, called *achora* by natives and Spaniards alike. The seeds are an efficacious vermifuge.

PINEAPPLE (*Ananas sativus* or *Ananasa sativa* Lindley). Has a fine flavor, aromatic and slightly tart, on account of the presence of malic acid. It is of more importance, however, as a textile plant.

RIMA (*Artocarpus incisa* L.). Composed of the numerous small female flowers united into one large, fleshy mass about the size of a child's head, and is

covered with hexagonal marks externally, which are the limits of the individual flowers. The flesh is a substantial food, and on this account it is called the breadfruit plant. It is either boiled or roasted and then eaten with sugar or syrup. It is also made into preserves.

SANTOL (*Sandoricum indicum* Cav.). Similar to the peach, but larger and the rind thicker. Inside there are several divisions, as in the mangosteen, of a white color and bittersweet taste, each division containing a hard pit with carminative qualities. It is used principally for preserves and pickles, although it is eaten raw when ripe. Bulacan, Luzon, produces the best *santols*.

SAPOTE (*Diospyrus ebenaster* Retz) and *pagápat* (*Diospyrus kaiki* L.), are natives of China. Among the large number of wild species of fruits found in the Philippines in general, sour, sweet, and somewhat carminative, may be mentioned the *doctoyan*, the *pananquitán*, the *duríon*, the *abult*, *amahit*, *anglap*, *amaga*, *agononan*, *abubunanu*, *alanganisan*, *dac*, *amamampang*, *bonano*, *harobor* or *marobo*, *cabaan*, *carong*, *cagos*, *gayán*, *dalinson*, etc., which are described by P. Delgado.

TAMPOY (*Eugenia jambos* L.). About the size of a small apple, the flesh being soft, sweet, and having an odor like roses. In color and shape it resembles a *guayaba*.

There is a large number of trees and plants in the Philippines that yield resins, gums, and waxes, none of which can be classified as agricultural, as they are not cultivated, nor is their growth fostered at present in any way other than by forestry regulations governing the cutting of timber. Many of them are susceptible of profitable cultivation, particularly trees yielding gutta-percha, which are found growing wild in many portions of Mindanao, and rubber-yielding trees and vines which grow in abundance in several of the southern islands, and can be made to grow luxuriantly almost anywhere in the archipelago by cultivation. Considerable business was carried on in former years in the collection and exportation of gutta-percha and rubber, but adulterations made by Chinese traders in these gums have caused the insular products to become discredited, and very little is now exported.

Essences or essential oils for perfumery purposes are obtained by distillation from the blossoms of three trees in the Philippines, the most important of which is the ilang-ilang (*Cananga odorata*, Hook). This tree is cultivated to a slight extent, but the wild growth on the mountain sides is principally utilized. It bears a profusion of small, highly fragrant blossoms of a greenish color, from which the greatly prized and valuable oil, bearing the same name as the tree, is extracted. This product is exported to France and other countries, where it brings highly remunerative prices.

The *sampaguita* (*Jasminum sambac* Alt.) yields white, fragrant flowers, from which a rich, agreeable perfume is extracted in limited quantities.

The *champaca* (*Michelia champaca* L.) is a conically shaped tree that grows to a height of about 4 meters. It is found in the mountains, but is cultivated in gardens, and from its flowers a well-known perfume is extracted.

There are various other growths from which essences or essential oil may be derived, but the three before mentioned are the only ones utilized as far as is known.

Antiquated methods and lack of enterprise.

Although agriculture, as has been stated, is the principal occupation in and chief source of wealth of the Philippines, it is conducted along very primitive lines and by antiquated methods that restrict production by failure to thoroughly till the soil, to gather full harvests, or to bring under cultivation the amount of land that, with modern methods and appliances, could be attended to with no greater expenditure of labor than is now used on small areas.

The plowing of land preparatory to the planting of crops is of the most superficial character, the surface of the ground not being disturbed beyond a depth of 2 or 3 inches; plows with a single handle and a small wooden share, sometimes tipped or edged with iron, are drawn by a slow-moving carabao, and merely scratch the earth. After plowing, the ground is frequently gone over with a rude wooden harrow drawn by the carabao, and such cultivation as is subsequently given a growing crop is very meager. The hoe, spade, and shovel, as used in the cultivation of field and garden crops in the United States, are practically unknown. The implement used almost universally by the Filipinos is the bolo, a short sword, which is used for all sorts of purposes, such as felling

trees, cutting down weeds, digging holes, stirring the soil between growing plants, etc.

Improved machinery, either for purposes of cultivation, harvesting, or preparation of the product for use, has scarcely any place in the economy of the Filipino farmer, but crude appliances and hand methods are almost universally in vogue.

Attempts that have been made since American occupation of the islands to introduce modern agricultural machinery have met with but slight success. Such implements and machines as have been imported and sold by commercial houses have mostly been disposed of to Americans or to the insular government for the use of the bureau of agriculture. The natives have made very few purchases.

A leading commercial house of Manila that since 1900 has handled about 90 per cent of all modern agricultural machinery brought to the islands states, in response to an inquiry from the director of the Philippine census, that during the three years they have been engaged in the business they have sold about 110 Deere plows of from 6 to 12-inch sizes, 6 heavy railroad plows, 3 middle-breaking plows, 2 breaking plows, 3 gang plows, 2 disk harrows, 5 50-tooth "Ajax" harrows, 3 15-tooth vineyard harrows, 5 hand corn shellers, 4 one-hole corn shellers, 2 rice hullers and polishers, 2 rice fans, 2 rice thrashers, 2 hand-power grain mills, 3 hay mowers, 3 steel hayrakes, 4 garden seeders, 4 garden cultivators, 25 hand-power feed cutters, and about 100 each of Giant 5-tooth and Planet, Jr., cultivators.

The stock carried by the company referred to consists not only of the articles of which sales have been made as above specified, but of many other implements commonly used on farms in the United States. The manager of the company makes the following statement, under date of August 14, 1903:

"At this writing we can see no encouragement whatever as to the Filipino taking up the use of modern machinery in preparing the soil. Of the above-mentioned implements the railroad plows, middle-break plows, breaking plows, gang plows, disk harrows, common harrows, rice hullers, fans, and thrashers have all been sold either to the military authorities or to the insular purchasing agent. The natives have purchased a few of the plows, probably 50 altogether, and probably 50 each of the 5-tooth and 12-tooth cultivators. These cultivators were sold mostly on the island of Negros for use in cultivating sugar. We believe we have handled far more agricultural machinery than all other companies in Manila put together, and from our experience we can say nothing that would be encouraging as to the native adapting himself to modern machinery. * * * We do not think there is a native in the Philippine Islands who has the slightest conception of the different classification of plows as applied to different soils and for different purposes. For instance, he does not understand or appreciate the difference between the common wood-beam plow, the low landslide plow, the stubble plow, the small stirring plow, the sugar plow, the turf plow, the subsoil plow, the special alfalfa plow, the root-ground plow, the vineyard plow, the breaking and middle-breaking plows, or the listing plow. He does not understand the use of the disk or the coulter.

"American modern machinery is made to be used with horses mainly, and the native naturally finds himself handicapped in the beginning. His carabao will pull a small 6 or 7 inch plow and a small cultivator or harrow; beyond this he can do nothing and his ideas lead him to believe he must use steam power or electricity. * * * The native does not understand the value of the farm wagon in transporting supplies to and from market, and prefers the ancient carabao cart."

Another prominent Manila importing house writes as follows:

"* * * We have imported quite a lot of samples (of American agricultural machinery) from which we have endeavored to make sales, but have thus far found it impracticable, owing to the fact that our American apparatus is made up in such a way that it is extremely difficult (and in many cases impossible) to adapt it for use with carabao, and it is too heavy for use with ponies.

"The only exception we have found to the above is small light plows and cultivators, but it is difficult to prevail upon the natives to change from their old customs until they can be shown the advantages which will accrue, which is being done to a considerable extent by the bureau of agriculture.

"The great dearth of work animals during the past few years has also doubtless contributed considerably to the lack of demand for agricultural impli-

ments, but the government importations of carabao will, in all probability considerably alleviate, if not entirely eliminate, this factor.

"The machines which we have imported * * * have been mostly sold to Americans. The number of natives looking for these things has been very small."

It may be safely predicted that when the slow, wasteful, ancient methods of agriculture in the Philippines shall have given place to modern ones, the wonderful productivity of the soil, and the great demand for and highly remunerative prices brought by the leading agricultural products will afford a surprising degree of wealth and prosperity to the islands.

Domestic animals.

The principal domestic and farm animals of the Philippines are the carabao, or water buffalo, neat cattle of Australian or Indian origin, horses, swine, and poultry. Goats and sheep are of slight economic importance and are found in limited numbers only.

The carabao is the most important animal in the archipelago. As in other oriental countries, it is not only the mainstay of agriculture, but is also extensively used as a draft animal and beast of burden. The country from which it was originally introduced is unknown, carabao having been found in the islands when the Spaniards first assumed dominion.

The following translation from the *Guía Oficial de Filipinas* gives an interesting description of this highly prized animal upon which the development and prosperity of the country so largely depend:

"The carabao, or water buffalo, is the most notable quadruped found by the Spaniards when they came to occupy these islands. There are few animals which are as ugly, but there are also few which are more useful in agricultural labors and which can resist the enervating climate of the Philippines better.^a Its color is black or brown; the hair is very scarce; the horns large, arched, and rough; and the head is comparatively small. Its strength is enormous. It easily swims the widest rivers, and can haul very large loads, although its progress is slow and its movements awkward. It likes humidity and to roll in the mud. The hide and horns of the carabao are of great commercial value. The carabao begins to work after it is five or six years old. It lives to about thirty years.

"The wild buffalo is to be feared. In its savage state it constitutes a real danger to man if met in the woods."

The calamity which has befallen the islands in the decimation of the carabao by rinderpest has been referred to elsewhere in this report.

Neat cattle of Australian or Indian origin are bred in large numbers, and are used to some extent for agricultural purposes. Their principal value, however, has consisted in their use as food, and in their hides and horns, which have been exported in considerable quantities.

The horses of the country, of which there were large numbers prior to the recent widely spread prevalence of an equine disease known as surra, which has slain them by thousands, are of the pony variety. Though of small size, they are strong and full of spirit, hardy, and consequently very useful. Some of them are very fast for short distances and make good race horses.

The swine of the islands are of poor breed, resembling the kind familiarly known in the United States as "razorbacks." Their flesh is of fairly good flavor, and is much prized as a food by the natives.

The poultry of the country consists principally of gamecocks and hens and their offspring, a few of which nearly every Filipino family is the possessor. Cockfighting is the national sport of the people, and the breeding of game roosters, though not capable of statistical presentation, is an important branch of insular employment, the sociological and economic effects of which can not easily be measured. The average Filipino thinks much more of his gamecock and the sport to be found in the cockpit than he does of the food value of his poultry and eggs.

Ducks and geese are also bred; in some localities the former are found in large numbers. In the Province of Rizal, on the Taguig and Pasig rivers, not

^a The author of this description should have said "there is none" instead of "there are few more useful and better able to resist the effects of the climate." *Director.*

far from Manila, duck raising is conducted on an extensive scale, being the principal industry of the inhabitants of the pueblo of Pateros. The breeding yards are fenced in with bamboo on the river banks and in these the full-grown ducks are confined during the day; in another inclosure nearby the partially grown ducks are kept; and in a third the ducklings are kept, the latter being separated from their elders as soon as hatched. Not far from the duck yards are the duck houses, a separate house being provided for the young, the partially grown, and the full-grown ducks, to which they are trained to go, each class to its respective domicile, at sunset; and every morning at dawn they leave their houses in orderly manner and enter their proper yards with almost military precision. The eggs are hatched artificially, usually in batches of 1,000, by being placed between bags of heated rice husks; and in this manner many thousands of ducks are produced annually, from the sale of which in Manila and neighboring towns considerable profit is derived. The general rule of the duck growers is to sell male birds only, the females being kept for breeding purposes.

The few sheep and goats in the islands are usually semiwild, of poor varieties, and of very little value.

Considerable light is thrown on general agricultural conditions in 1903 by the provincial governors and census supervisors in reports made by them to the director of the Philippine census immediately after the census of the islands was taken. Their statements in regard to this subject have been largely used in preparing this report.

Fruits, Vegetables, and Fiber Plants.

[By Hon. F. Lamson-Scribner, chief of the insular bureau of agriculture.]

All races of men who are wholly or largely dependent upon their own resources for food, raiment, and the common necessities of life, acquire close familiarity with the plants about them, and the Filipinos illustrate this fact in a marked degree. They have discovered uses in a multitude of native plants which a more highly civilized and less primitive people would never have learned to recognize. The numerous plants whose products are utilized for food, together with the great number of fiber plants contained in this list, illustrate this statement. Had the list included all the gum and resin bearing species and those of reputed medicinal value known to the natives, the truth of the statement would have been even more strongly emphasized. As it is, one can not fail to appreciate the wonderful resources of the Philippines in its vegetable and plant products.

The preparation of this enumeration of fruits, vegetables, and fiber plants of the Philippines was made possible by the many and intelligent reports rendered by the correspondents of the insular bureau of agriculture in all parts of the archipelago which were sent as replies to certain inquiries issued by the chief of the bureau, and it is upon these reports that the information here presented is chiefly based. There were many names reported which have been omitted because of lack of sufficient data concerning them, and, as will be seen, there are many plants among those yielding fibers which are yet unclassified. The list is, however, as complete as the material at hand will permit at this time, and it is believed that its presentation will not only afford useful and interesting information relative to the resources of the islands, but be a guide and assistance to others who may wish to take up the study of the economic plants of the Philippines.

* * * * *

Alcoholic plants.

Buri.—The buri palm was reported in 24 provinces, and in all islands embraced by Table 19.^a The area for the archipelago is given as reported on the schedules, but for the reason given this total can not be accepted as indicating the amount of land devoted to buri, because this palm is not, as a rule, planted in groves with defined boundaries, but is set out at random—a tree here and a tree there—and consequently a correct statement regarding area is well-nigh impossible.

^a This table has been omitted.

The use of the palm for the production of the starch food commercially known as sago was greatest in the province of Iloilo and on the island of Panay. In the production of this food the palm is cut down and the starch extracted from the trunk.

The leaves of the buri palm are used in making hats, mats, and other woven articles of domestic use. Of the provinces, Pangasinan was the largest producer along this line and of the islands, Luzon. The fruit is edible and greatly prized, and was most largely produced in Cebu Province and island.

Tuba, the sap extracted from the palm, is used as a beverage, and also for the distillation of alcohol. More liters of this liquid were gathered in the province of Batangas and on the island of Luzon than elsewhere.

Nipa.—The nipa palm is cultivated in 29 provinces. It is a highly important growth, and the leaves are used in the construction of the houses in which the natives live, while its sap, or tuba, is extensively used in distilling alcohol.

The largest provincial area devoted to the growth of nipa was in Pampanga, in which there were 7,195 hectares out of a total of 29,258 hectares for the archipelago; and on the island of Luzon, 21,749 hectares were planted in this useful palm. The province and the island named were the largest producers of nipa leaves, the first producing 117,404 thousands and the latter 131,434 thousands out of a total production of 138,875 thousands of leaves in the entire archipelago.

Tuba was more largely extracted from nipa palms in the province of Capiz, in which the production amounted to 39,877,059 liters, than in any other province; Bulacan ranked next, with 31,228,314 liters, and Pampanga third, with 13,733,031 liters; the production in no other province reached 5,000,000 liters. Of the islands Luzon headed the list with a production of 45,040,073 liters, and Panay stood next, with 41,234,800 liters; no other island produced as much as 4,000,000 liters. The total production in the archipelago was 103,311,680 liters.

Aromatic plants.

Cocoa.—Cocoa, otherwise known as cacao, was cultivated to a limited extent in all the provinces except Benguet, Lepanto-Bontoc, and in the comandancia of Siasi. Only 11 provinces had as much as 100 hectares devoted to this useful and profitable culture; the cultivated area in other provinces ranged from 1 to 99 hectares, the total number of hectares in all of them amounting to only 764 hectares.

Fiber plants.

Cotton.—The culture of cotton was much more important in former years than it is at present. Its cultivation is, and always has been, almost wholly confined to the island of Luzon, the quantities grown in other islands being comparatively insignificant. In 1902, more than half the cultivated area on the island named was in the province of Ilocos Norte, in which there were 1,591 hectares of land in cotton, and the quantity produced was 605,029 kilograms; the adjoining province of Ilocos Sur produced 244,140 kilograms on 645 hectares, the combined area of the two provinces constituting 73.2 per cent of all lands (3,053 hectares) devoted to the staple in question, and their aggregate production being 64.2 per cent of the 1,322,118 kilograms grown in the entire archipelago. Only two other provinces, both on Luzon Island, had an area in excess of 100 hectares in cotton—Batangas, with 239, and La Union, with 266, upon which there were reported as produced 21,206 and 362,434 kilograms, respectively. The combined cotton area for the 17 remaining provinces and comandancias in which the fiber was produced was only 312 hectares, and their total production, 89,286 kilograms.

Pineapple.—This plant, which is principally grown for the fiber yielded by its leaves, is found in most of the provinces and principal islands. Its fruit is also utilized to a considerable extent, particularly in the province of Bataan, from which no fiber was reported, the entire product of 30 hectares consisting of fruit which found ready market in the near-by city of Manila. In the entire archipelago the total reported area in pineapples was 613 hectares, upon which the production in 1902 amounted to 952,400 fruits and 292,403 kilograms of fiber. More than half the area and fruit production were in provinces on the island of Luzon, and 46 per cent of the fiber was produced in the same provinces.

Fruits.

Bananas.—This highly important fruit grows in every province and inhabited island of the Philippines, both in the wild and cultivated state, and numbers over 50 varieties, some of them of unexcelled delicacy and flavor. The statistics regarding its production and area are interesting only as indicating the extent to which the natural, spontaneous growth has been supplemented and added to by such industry as the natives have exerted in setting out plants in the vicinity of their homes, which after planting receive very little, if any, attention in the way of real cultivation.

The entire cultivated area devoted to the banana in the archipelago was reported as 33,913 hectares, upon which 14,078,600 bunches of the fruit were said to have been produced. As in all other products except sugar, provinces on Luzon produced more than those on any other island. The largest cultivated area and production of any single province was in Leyte, which shows a yield of more than double that of any other.

Betel nuts.—The use of the betel nut by the natives rivals that of tobacco, the latter being used almost exclusively for smoking, while the former is chewed. As a cultivated product, however, its area of production and yield are not extensive, and there are 19 provinces and 7 principal islands in which no production whatever was reported or the quantity reported was so insignificant as to be unworthy of mention. Only 6 provinces and 3 principal islands show cultivated areas of 100 hectares or over; the total area for the entire archipelago was 2,572 hectares, upon which 525,577 thousands of nuts were produced.

Cocoanuts.—The planting of cocoa palms in groves throughout the archipelago generally has very materially added to the area upon which this useful tree grows. The wild growth, though no statistics regarding it can be given, is known to be enormous—probably greater than that designated as cultivated; and, as is the case with most other Philippine agricultural crops, the data given in the tables regarding the extent to which the tree is cultivated (i. e. planted) and the quantities of its different products, are useful only as indicating the extent to which native energy has been applied in increasing the natural, unaided growth.

The product of greatest commercial importance, the exports of which to the United States and Europe are steadily increasing in volume and value, is copra, the dried kernel of the coconut; enormous quantities of tuba are also drawn from the trees, and the oil derived from the nuts is used by the inhabitants for illuminating and other purposes, as explained in previous pages.

Guavas, lanzones, and oranges.—These fruits are not cultivated to any great extent. The largest areas devoted to guavas were in the provinces of Tayabas and Ambos Camarines, in which 211 and 173 hectares, respectively, were reported as planted in this fruit. The cultivated area did not amount to as much as 100 hectares in any other province or district. The total amount of such area was only 1,052 hectares, and the total reported production for the entire archipelago was only 496,575 hundreds of the fruit. Lanzones were cultivated on a still more limited scale. The total cultivated area was returned as 614 hectares of which 417 were in the province of La Laguna, and the total production was given as 67,585,686 liters, of which nearly 97 per cent was grown in the province named. The reports show that 100,178 hundreds of oranges were gathered from trees planted on 871 hectares in all the islands. Five hundred and forty-seven hectares in Batangas Province, Luzon, were reported as yielding 62,115 hundreds. In other provinces and islands the cultivated area and crop were insignificant.

Mangos.—The mango, sometimes designated as the "king of fruits," attains its greatest perfection in size and flavor in the Philippines. It grows wild in most of the inhabited portions of the archipelago, and is shown by the census returns to have been more extensively cultivated than all other fruits combined, except bananas and cocoanuts. Though the separate cultivated areas are small, their aggregate amounted to 3,317 hectares, which produced something over 100,000,000 of the fruit.

Gramineous Plants.

Corn.—This cereal, locally known as maize, is cultivated more or less extensively in all the provinces and principal islands. The total area in 1902 was reported as 107,981 hectares, upon which 1,195,254 hectoliters of the grain

were produced. This is one of the few Philippine crops requiring cultivation, therefore the data given in the tables may be taken as representing its entire area and production.

Grass.—Many varieties of grass are grown in the islands for stock feeding purposes. When cut it is usually tied in small bundles immediately and used in its green, uncured state. Several crops are ordinarily cut from the same meadow each year and, as it is not weighed but sold by the hundred bundles, which are of various sizes, according to the kind and quality of the grass and the custom of cutters and purveyors in different localities, the number of kilograms produced can only be estimated. The largest areas and yields are naturally in provinces containing cities or in those situated near centers of population. Of the latter class is the Province of Rizal, adjoining the municipality of Manila, in which nearly 20,000,000 kilograms are reported as having been produced—more than half the reported production of the entire archipelago, which is given as nearly 37,000,000 kilograms. About 3,000,000 kilograms were produced within the corporate limits of the city of Manila. The only other provinces producing 1,000,000 kilograms and upward were Albay, Iloilo, and La Union. Of the islands, Luzon produced nearly 30,000,000 kilograms, about 80 per cent of the entire yield, the only other important producing island having been Panay, upon which a little over 6,000,000 were reported.

Paddy (unhulled rice).—The production of rice is the most important agricultural industry of the Philippines, as far as the domestic economy of the people is concerned. When obtainable, it is the principal vegetable food of nearly all Filipinos, who, in common with the populace of other oriental countries, value it more highly than any other comestible. The islands have not, for many years, produced this article of prime necessity in sufficient quantities to supply domestic requirements, and the annual deficiency has been made good by imports from foreign countries. In 1902 the reported insular yield amounted to 8,599,233 hectoliters from 592,766 hectares of land, an area far in excess of that devoted to any other cultivated crop; in addition it was necessary to import something over 290,000,000 kilograms of the grain to meet the requirements of the people. This condition is likely to continue indefinitely, it being more profitable to raise other crops, particularly hemp. The proceeds derived from the sale of hemp from a given amount of land will purchase much more rice than could be grown on the same area, and as long as this remains true the islands will undoubtedly depend to a large degree on importations of the grain.

It is grown in every province, comandancia, and principal island of the archipelago, though in some of them the quantity produced is small. The average yield per hectare in all the islands in 1902 was 1,451 liters, from which there were wide variations in the different provincial and insular sections.

Beans, gabe, and tomatoes.—These three vegetables are cultivated to a comparatively small extent in most of the islands and provinces. In a majority of them the production is too small to be of other than slight local importance. The total cultivated area reported for all three amounted to only 6,694 hectares, of which 3,170 were in beans, 2,271 in gabe, and 1,253 in tomatoes. The total production of each was reported as follows: Beans, 1,752,283 liters; gabe, 4,827,155 kilograms, and tomatoes, 2,856,341 kilograms.

Sweet potatoes.—The tuber known throughout the islands as "camote" is, in point of importance, a domestic food product second only to rice. It grows profusely and yields abundantly in all sections, and is a favorite article of diet. The cultivated area and yield of this vegetable by no means cover the extent to which it is grown and produced; they only indicate the degree to which the natives have exerted themselves in its production. When once planted, the sweet potato is said to grow with very little or no further attention, and spreads without cultivation into new ground, yielding what are sometimes called "volunteer" crops in large quantities.

As compared with average or normal yields, the crops of all kinds gathered in 1902 were very small. The destruction of carabao and horses by rinderpest and surra, the devastations of insect pests, the prevalence of drought in many sections of the archipelago, and the ravages of cholera inevitably resulted in heavily diminishing the yields of all agricultural products.

Effort was made, through inquiries in Schedule No. 5, to secure statistics along this line, but the lack of records and the prevailing inability of the agricultural population to supply definite information regarding yields of previous years, as compared with those of 1902, prevented the securing of specific data.

Information of a general character was, however, obtained, upon which it is possible to base the statement that the yield of crops was on the whole not more than half the normal amount.

The special agents attempted to secure data regarding the agricultural pursuits of the non-Christian tribes in the different provinces and islands inhabited by them, as called for by the schedule used in enumerating the wild tribes.

Before the census was taken, it was not believed to be practicable to secure this information in such detail as to be of statistical value; nevertheless, the effort was made. The results of the canvass verified the expectations regarding their probable lack of completeness. It was found that the furnishing of information regarding areas and quantities of production was quite beyond the capacity of the wild people who, as a rule, have no proper conception of the meaning of numbers and who were totally unable, except in occasional instances, to answer questions, the replies to which involved the giving of mathematical expression to agricultural operations.

All that could be done, in most cases, was to secure lists, more or less complete, of the different products derived from the soil by the various tribes; approximate numbers of different kinds of domestic animals owned by them, and a little meager information regarding their industries aside from that of agriculture.

With regard to their farming, it is sufficient to say that they cultivate substantially the same plants, fruits, and vegetables as their Christianized compatriots. To give a list of these products is deemed unnecessary, as it would simply be a repetition of the names of products already specified as cultivated by the civilized tribes.

Of all the wild tribes, the Igorots, inhabiting the mountains of northern Luzon, are undoubtedly the most expert and industrious agriculturists. Their methods of cultivation, particularly those used in the cultivation of rice, and their irrigation systems have been described and illustrated in various official and other publications, and nothing can be said here in addition to what has been heretofore published in respect to them. For the benefit, however, of such readers as have not been previously informed regarding this remarkable people, the following extract is given from the official report, dated July 8, 1902, of Mr. Elmer D. Merrill, the botanist of the insular bureau of agriculture, on an overland trip made by him from Manila to Aparri during the months of May and June, 1902:

"*Rice*.—This is the staple crop and was cultivated in most localities visited on the trip. Methods of cultivation are very crude, and, with the exception of lands cultivated by the Igorots, but one crop is produced in a year, and that is grown during the rainy season. * * * In and about Quilañgan, Neuva Vizcaya, the Igorots, by artificial irrigation, produce two crops each year, their rice being of superior quality, with larger, practically awnless heads and larger grains than seen elsewhere. * * * During our stay in Quilañgan we had abundant opportunity to observe the methods of agriculture pursued by these people. Rice is the staple crop, but corn, potatoes, cabbage, camotes, beans, tomatoes, gourds, etc., are raised. Their system of agriculture is the most carefully observed in the island, the ground being carefully prepared and kept scrupulously free from weeds during the growing season.

"The Igorot uses no beast of burden, carabao and ponies being valued only as food. Pigs and chickens are raised, however. All the work is done by hand, the enormous system of rice paddies, extending for 2 or 3 miles up the steep mountain sides, on all sides of Quilañgan, being evidently the results of the work of generations of these people—their only agricultural implements being a bolo and a heavy wooden shovel, the blade of which is about 8 inches wide. All these rice paddies are irrigated by utilizing the mountain streams, two crops of rice being produced each year, the rice being of superior quality to that grown down in the valleys by the Ilocanos and Tagalogs. For guarding against the heavy rains of the wet season, they have an ingenious method of sluiceways to carry off the surplus water. Often the terrace banks will be 8 or 10 feet high, and many of the terraces are no more than 1 yard in width, the average size of the paddies being very small. They are very similar to those in the mountains of Ceylon, in the neighborhood of Kandy.

"The Igorots value seeds of new plants very highly, and would certainly make good use of any that might be sent them. They now raise potatoes and other vegetables in considerable quantities, which they offer for sale in the vari-

ous market towns in the valleys. In the opinion of Governor Ney of Neuva Vizcaya, the one method that would be productive of the best results in bringing these people under control would be by the distribution of garden seeds among them. At present they are under little or no control, but with the exception of those tribes known as the "head-hunters," they lead peaceable lives so long as they are unmolested."

None of the other wild tribes approach the Igorots in point of industry and agricultural production. By all the methods and implements used are of the crudest, most primitive sort, and the extent and results of their labor are, as a rule, barely sufficient to supply the demands of a very limited home consumption of such products as they cultivate.

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PHILIPPINE AGRICULTURAL PRODUCTS, WITH BRIEF DESCRIPTIONS OF THE PLANTS, THEIR DISTRIBUTION AND USES, COMPILED FROM THE REPORTS OF CORRESPONDENTS OF THE BUREAU, BY F. LAMSON-SCHIBNER.

MANILA, September 2, 1903.

- Achras sapota*, Linn.—Chico (Sp. T.); Chicle (Eng.). A tree, 15 to 20 feet high, introduced from America, and cultivated in gardens throughout the archipelago. The fruit is edible and the sap yields valuable gum. It is highly appreciated.
- Agaricus* sp.—Payong ahas (T.); Agarico (Sp.); Agaric or Mushroom (Eng.). An umbrella-shaped cryptogamous plant, found in Luzon and the Visayan and Mindanao Islands. The entire plant is edible. Many species of *Agaricus* and genera related to them grow spontaneously throughout the archipelago.
- Agathis loranthifolia*, Salisb.—A lofty tree, from which the valuable resin called "Almაცა," dammar of commerce, is extracted. It is found on the mountains of southern Luzon and Panay Islands at elevations of from 500 to 1,000 meters. The resin is sold in Manila at \$7 to \$8 Mexican per picul.
- Albizzia procera*, Benth.—Adyangao. A tree furnishing a resin used as incense.
- Albizzia saponaria*, Blume.—Cogontoco. Yields resin for lighting purposes.
- Aleurites saponaria*, Blanco.—Bagullumban (T.); Balocanad (V.); Balucanang (Il.); Calumban. A native tree of Luzon and the Visayan Islands. The fruit is used in the manufacture of an ordinary kind of soap sold in Manila.
- Aleurites triloba*, Forst.—Capili, Lumbang (T.). A tree growing in Luzon and the southern islands. The fruit is used for making oil for illuminating purposes and a fertilizer, both of which are largely sold in Manila.
- Allium cepa*, Linn.—Lasona; Sibuyas (T.); Cebolla (Sp.); Onion (Eng.). A vegetable grown throughout Luzon and the Visayan Islands. The bulb and leaves are used in cookery.
- Allium sativum*, Linn.—Bawang (T.); Ajo (Sp.); Garlic (Eng.). An herb raised in small quantity throughout the archipelago. The leaves and bulb are used as a condiment.
- Allium tricocum*, Ait.—Cuchay, Cutsay (T.); Ganda (V.); Wild Leek (Eng.). A bulbous plant grown in the gardens of Luzon and other islands occasionally; spontaneously in Leyte. The leaves are used for condiment.
- Amaranthus spinosus*, Linn.—Bayang-bayang (Il.); Calites (V.); Coletes (T.); Colitis (T.); Cuanton, Harum (V.); Orayl. A native herb, 2 to 3 feet high, found on Luzon, the Visayan Islands, etc. The ash made from the plant is used for dyeing.
- Anacardium occidentale*, Linn.—Balubad (T.); Balubat (Pn.); Balurad (T.); Bologo (Il.); Casoy (T.); Cashew (Eng.). A small tree or tall shrub, raised in small quantities upon Luzon and other islands, having been introduced from tropical America. Fruit and seeds are edible; the former for dessert, and the latter to mix with chocolate after being roasted. Oil is obtained from the seeds.
- Ananas sativus*, Schult.—Piña (T. Sp.); Pineapple (Eng.). An herb raised throughout the archipelago for the flavor of its fruit, for local consumption.
- Anisoptera thurifera*, Blanco.—Lauan. A large tree that yields transparent, hard, and odorous resin of white-yellowish color, esteemed in commerce and used as incense, for the manufacture of varnishes, and for calking boats. Found throughout the archipelago.
- Anisoptera oblonga*, Dyer.—Sandana. A tree like Lauan, and grows in the southern part of Luzon, and the islands of Leyte and Mindanao. It yields a resin which is aromatic.

- Anona muricata*, Linn.—Gayubano (Il.); Guanabano (P. Il.); Guayabano (T.); Guayabano (T. V.); Guanabana, Suirsaak, Susakka, Soursoy (Eng.). A tree, 20 feet or more in height, found in Luzon and the Visayan Islands, introduced from America. The fruit is edible and good for preserves.
- Anona reticulata*, Linn.—Anonas (Sp. T.); Custard Apple (Eng.). An exotic tree from Mexico, 10 to 20 feet high, grown for local consumption on Luzon Island. The fruit is edible.
- Anona squamosa*, Linn.—Ates (T. Sp.); Atis (V.); Natis (P.); Sugar Apple, Sweetsop (Eng.). A small tree or shrub whose fruit is edible. It is highly prized and is found on Luzon and other islands, and used for local consumption.
- Antidesma bunius*, Spreng.—Bignay (P.); Bugnay (T.). A tree growing wild in Pampanga, Rizal, and other provinces. The fruit is edible, and is good for preserves.
- Apium graveolens*, Linn.—Quinchay, Quinsay (T.); Aplo (Sp.); Celery (Eng.). A garden vegetable, growing throughout the archipelago, used locally. The leaf-stalk is used for dressing.
- Apium petroselinum*, Linn.—Perejil (Sp.); Parsley (Eng.). A garden vegetable cultivated for local consumption.
- Arachis hypogæa*, Linn.—Mani (T.); Cacahuete (Sp.); Ground Nut, Peanut (Eng.). A herb, cultivated in Luzon and other islands for forage. The seed is edible and is used for making oil, etc.
- Areca catechu*, Linn.—Bonga, Bunga (T.); Bonga (Sp.); Betel Nut (Eng.). A palm raised in all gardens throughout the archipelago. It grows to a height of about 30 feet. The nut is chewed by the natives. The leaves, stalks, and seeds are also utilized.
- Artocarpus camansi*, Blanco.—Camance, Camansi (V.); Camongsi, Dalangian, Dolongian; Pacac (Il.); Breadfruit (Eng.). A tree, 60 feet or more in height, growing in Luzon, Antique, Iloilo, and other islands, though rarely cultivated. The seed may be eaten raw or cooked. The flowers are good for sweatmeats.
- Artocarpus incisa*, Linn. f.—Antipolo, Rima (T.); Tipolo (P.); Breadfruit (Eng.). A tree growing to a height of about 60 feet, found throughout the archipelago. It is sometimes planted. The sap, bark, and fruit are utilized. The fruit is valued for preserves.
- Artocarpus integrifolia*, Linn. f.—Anangca (Il.); Langka, Nangka (T.); Jak Fruit (Eng.). A tree, 20 to 30 feet high, raised in gardens throughout the archipelago for local consumption. The fruit is eaten raw or cooked, and is good for preserves. The seeds when boiled or baked somewhat resemble chestnuts.
- Artocarpus rima*, Blanco.—Colo (V.); Ogob (B.); Rima (T.); Breadfruit (Eng.). A tree planted in the gardens of Luzon and other islands. When cooked the fruit is eaten, and is valued for making sweetmeats.
- Asparagus officinalis*, Linn.—Esparrago (Sp.); Asparagus (Eng.). An introduced garden vegetable raised in very small quantities in Cebu, Ilocos, and Manila. The young stalks are eaten when cooked.
- Asplenium esculentum*, Presl.—Paco (T.). A common fern growing spontaneously in Luzon and other islands. The young leaves are used as a vegetable.
- Averrhoa bilimbi*, Linn.—Camias (T.); Kamias (B. T.). A small tree raised in gardens on the island of Luzon. The fruit is used for dressing, sweetmeats, etc.
- Averrhoa carambola*, Linn.—Balimbing, Balinbin, Bilimbin (T.); Carambola, Coromandel Gooseberry (Eng.). A tree, about 25 feet high, cultivated in gardens of Luzon and other islands. The fruit is eaten raw and used for desserts, etc.
- Bauhinia tomentosa*, Linn.—Allbanban (T.). A small tree, 20 feet high, growing wild in Rizal, etc. The leaves yield an acid used as a substitute for vinegar.
- Beta vulgaris*, Linn.—Acelga (Sp.); Beet (Eng.). A vegetable found nearly throughout the archipelago, especially in Benguet; produced for local consumption. The leaves are used as a condiment, etc., and the fleshy roots are edible when cooked.
- Bixa orellana*, Linn.—Achote (T.); Achote, Achote (Sp.); Anatto, Annotta, Arnotto (Eng.). A small tree or shrub, about 10 feet in height, found throughout the archipelago, although not largely grown; introduced from tropical America. The fruit yields a coloring matter and is used in cooking, to color butter, etc.

- Brassica oleracea*, Linn, var.—Repollo (Sp. T.); Cabbage (Eng.). A vegetable, raised to a large extent in Luzon Island, etc., for local use. The leaves are edible.
- Brassica oleracea*, Linn, var.—Coltflor (Sp.); Cauliflower (Eng.). A vegetable found in Pampanga and other provinces, but rarely raised. The bud is used for pickling.
- Casalpinia sappan*, Linn.—Sapang, Sibucan (T.); Palo-Brasil (Sp.). A tree, 14 feet or more high, growing in Luzon and Panay islands, which yields a red coloring material, sold largely in Manila markets, and exported to China and England.
- Cajanus indicus*, Spreng.—Cadlos, Cadiws (V.); Cagulos (T.). A vegetable found in Occidental Negros, Romblon, Antique, etc., though rarely planted.
- Calophyllum inophyllum*, D. C.—Bitanhol, Bitang (T.); Dancalan, Dincalan, Tamaulan; Palo Maria (Sp.). A tree, growing wild upon the seashores throughout the archipelago. The seeds are used in making oil, and the bark yields a resin, both highly appreciated by the natives.
- Cananda odorata*, H. F. et T.—Alangilang (T.); Angilang (V.); Ilang-ilang (T. Sp.). A tree, 25 to 40 feet high, found throughout the archipelago. It is highly prized and grown for commerce, especially around Manila, Mindoro Island, etc., being valued for its flowers, which yield a fine perfume. The essence, called "Ilang-ilang," is exported to France, England, China, and Singapore.
- Canarium album* Blanco.—Pilani (T.); Pill (V.). A tree found in southern Luzon, and sometimes planted. The nut and sap are utilized, the latter being produced on a commercial scale.
- Capparis mariana* D. C.—Alcaparras (Sp.); Capers (Eng.). A shrub, 7 feet high, whose buds and fruits are used as condiments. It is found in Rizal Province, and is very scarce.
- Capsicum* sp.—Chile, Sile (T.); Pimiento (Sp.); Red Pepper (Eng.). An herb or shrub, many varieties of which are cultivated as garden vegetables throughout the archipelago. The leaves and fruit are used in cookery.
- Capsicum minimum* Roxb.—Chileng Bundoc (T.); Pasitis; Guindilla (Sp.); Red Pepper (Eng.). A shrub found upon Luzon Island. It is sometimes planted, and the fruit is used in cookery, etc.
- Carica papaya* Linn.—Capayas (V.); Papaya (T. Sp.); Pawpaw. A small tree, 20 feet high, of American origin, a garden product throughout the archipelago. The fruit is sweet and pleasant to the taste, and is used in making sauces, preserves, pickles, and desserts. There are two sexes, the flowers being dioecious.
- Caryota onusta* Blanco.—Caong, Cauong, Iroc (T.). A sort of sago is extracted from the fibrous stalk of this palm; and also tuba from an incision in the fruit.
- Caryota urens* Linn.—Banga or Pugahan (T.). A palm producing a starch or a species of sago of good quality.
- Castanopsis philippinensis* Vidal.—Talakatac; Wild Chestnut (Eng.). A tall tree found on Luzon and other islands, though not cultivated. The fruit is utilized.
- Chenopodium ambrosioides* Linn.—Alpasotes, Apasotis (T.). A native herb found wild throughout the archipelago. The leaves are used for seasoning food.
- Cichorium endivia* Linn.—Escarola (T. Sp.); Endibia (Sp.); Endive (Eng.). A garden vegetable raised for local consumption on Luzon, etc. The leaves are used for salad.
- Cinnamomum burmanni* Blume.—Canela (T. Sp.); Cinnamon (Eng.). A small tree or shrub whose bark is used as a spice. It is found in the Philippines, especially in Mindanao, and formerly was cultivated.
- Cissus acida* Linn.—Cagulndi (V.); Calitcalit, Cavilan (T.); Culutpamu (P.); Langingi, Lopo, Lopo-lopo, Lupo, Pacopol (V.). A native climbing herb, growing spontaneously on Visayan and Luzon islands. The young stems and leaves are edible and used as a substitute for vinegar.
- Citrullus vulgaris* Schrad.—Pakwan (T.); Sandia (Sp.); Watermelon (Eng.). An herbaceous vine, grown in small quantities throughout the entire archipelago. The fruit is used for dessert, the best being raised in Bulacan.
- Citrus aurantium* D. C.—Cagel, Cahil (T.); Large Lemon (Eng.). A fruit tree, growing on Luzon and other islands, whose fruit is highly esteemed. This tree furnishes a resin used for illuminating purposes.

- Citrus decumana* Linn.—Lucban, Suha (T.); Naranja (Sp.); Orange (Eng.). A tree, 20 to 25 feet high, several varieties of which are planted in gardens throughout the islands of Luzon, Visayas, and Mindanao. The fruit is edible.
- Citrus medica* Linn.—Limon real (Sp.); Lemon (Eng.). A small tree, a garden product of Luzon and Panay, valued for its fruit.
- Citrus medica* Linn. var. *acida*.—Dalayap (T.); Limon (Sp.); Lemon (Eng.). A shrub grown in the gardens of Luzon Island, etc. The fruit is used for seasoning.
- Citrus mitis* Blanco.—Calamansi, Calamunding (T.); Limoncito (Sp.); Small Lemon (Eng.). A small tree, 10 to 15 feet high, found in nearly all gardens. The fruit and leaves are utilized for condiment and also in bathing as a perfume.
- Citrus notissima* Blanco.—Dayap (T.); Limon (Sp.); Lemon (Eng.). A shrub or very small tree, cultivated in the gardens of Luzon and other islands, and highly prized. The fruit is used in cookery, etc.
- Citrus reticulata* Blanco.—Naranjitas, Sintones (T. Sp.); Small Oranges (Eng.). A tree, growing upon Luzon and other islands. The fruit is highly prized, especially that from Laguna. It is grown commercially.
- Citrus torosa* Blanco.—Cabuyao (T. P.); Colobot (T.). Lemon tree, grown rarely in the island of Luzon for local use. The fruit is utilized in bathing and bleaching, and is edible, though not ordinarily used as an article of food.
- Cocos nucifera* Linn.—Niog (T.); Coco (Sp.); Cocoanut (Eng.). A palm, widely cultivated throughout the archipelago. Wine, vinegar, and many other products are manufactured from the sap, fruit, nuts, leaves, veins, etc. Copra, the principal product, is largely exported.
- Coffea arabica* Linn.—Cafe (T. Sp.); Cahaua (M.); Coffee (Eng.). A bush, 8 feet high, more or less, found throughout the Philippine Islands. It is valued for the seed (berry) which is a staple product, the best quality being grown in Batangas.
- Colocasia antiquorum*, Schott. var.—Dagmay (V.) Gabe, Gaby (T.); Gallang (B.); Gave (Il. Z.). A perennial herb, cultivated throughout the archipelago. The fleshy roots, leaves, and young shoots are used for food.
- Colocasia esculenta*, Schott.—Caladi (V.). A perennial herb, raised in small quantities on Panay Island. The leaves, young shoots, and starchy roots are edible.
- Convolvulus repens*, Willd.—Cancong (T.); Tancong, Tangcong (V.). An aquatic vine, growing wild throughout the archipelago. The stem is used in making salad, etc.
- Corchorus oblitivus*, Linn.—Saluyot (Il.). A shrub, found in Ilocos Norte; sometimes planted. The leaves are eaten when cooked.
- Coriandrum sativum*, Linn.—Cilantro, Comino (Sp.); Culantro, Ongsoy (T.). An herb, raised in small quantities as a garden vegetable on Luzon and other islands, whose leaves, stem, and seed are used for dressing.
- Corypha umbraculifera*, Linn.—Burl (T.). A lofty and beautiful palm, very well known in the Philippines for its usefulness, giving name to the island of Burlas, where it is found abundantly. Sago of commerce is obtained from the soft interior part of the trunk. The fruit is edible, and tuba is obtained from an incision in the same. The tuba is made into wine and also a sort of sugar called pacasas, resembling maple sugar.
- Crocus sativus*, Linn.—Dilao (T.); Azafran (Sp.); Saffron Crocus (Eng.). A perennial herb sparingly grown in Luzon and other islands. The root is used for seasoning.
- Cucumis melo*, Linn. var.—Atimon, Catimon (V.); Melon (Sp.); Milon (T.); Melon (Eng.). An herbaceous vine raised for local consumption in Panay, Luzon, etc. The fruit is valued for dessert.
- Cucumis sativus*, Linn.—Calavaga (V.); Pepino (T. Sp.); Cucumber (Eng.). An herbaceous vine raised in small quantities throughout the Philippines. The fruit is used for making salad, etc.
- Cucurbita lagenaria villosa*, Linn.—Calabasang puti, Opo, Upo (T.); White Squash (Eng.). A tendrill climbing plant, raised as a garden vegetable for local consumption throughout the archipelago. The fruit is eaten when cooked.
- Cucurbita maxima*, Duchesne.—Calabasang pula, Calabasang Bilog (T.); Red-squash (Eng.). A vine-like herb found throughout the archipelago, several varieties of which are grown for local use. The flowers and fruit are used for condiment, sweetmeat, etc.

- Cucurbita pepo*, Linn. var. *Aspera*.—Condol (T. Sp.). An herbaceous vine, grown for local use in Luzon and other islands. The fruit is used for making sweetmeats, etc.
- Daucus carota*, Linn.—Carrot (Eng.); Zanahoria (Sp.). An herb cultivated for local use in Camarines, Cavite, Cagayan, etc. The root is edible.
- Dillenia philippinensis*, Rolf.—Catmon (T.). A tree the acid of which is used by the natives as a substitute for vinegar.
- Dioscorea alata*, Linn.—Ube (T.); Yam (Eng.). A climbing herb growing on Luzon and other islands, sometimes raised to a large extent. The tuber is used as an article of food.
- Dioscorea divaricata*, Blanco.—Ballacag (V.); Cobag; Dulian (Il.); Obat; Paquit; Chinese Potato, Yam, Cinnamon Vine (Eng.). A tall climbing plant with edible tubers. Found in northern Luzon and the Visayan Islands, and is sometimes cultivated.
- Dioscorea papillaris*, Linn.—Tongo, Tungo (T.). A vine found wild, but sometimes planted for its edible root or tuber.
- Dioscorea pentaphylla*, Linn.—Lima, Lima-lima, Nami-conot, Sap-ang. A vegetable growing in Luzon, Panay, Negros, Cebu, etc., though rarely cultivated. The tuberous root is edible.
- Dioscorea sativa* Linn. var.—Togul, Tugue, Tugueng pulo (T.) vine grown as a garden vegetable in Luzon and other islands. The tuberous root is edible.
- Dioscorea triphylla*, Pers.—Calut (P.); Carot (Il. V.); Corot (V.); Gayos (V.); Karot (Il.); Nami (T.). A vegetable found in Luzon and the Visayan Islands. The root is eaten when cooked. In times of scarcity it becomes a staple article of food among the mountaineers. The juice is also used.
- Diospyros cunalon*, D. C.—Cunalon. A tree the bark of which when dried and reduced to a powder produces a black coloring matter used by the natives for dyeing purposes.
- Diospyros discolor*, Willd.—Mabolo (T.); Talang (P.); Persimmon (Eng.). A native tree growing wild and also planted in gardens in Luzon and other islands. The fruit is edible.
- Diospyros ebenaster*, Retz.—Sapote, Zapote (T.); Persimmon (Eng.). A tree found in Cebu, Luzon, Mindanao, and Panay islands, though rarely planted. The fruit is edible.
- Diospyros pilosanthera*, Blanco.—Amaga (V.); Bolongaeta (T.); Dalongdong (V.); Persimmon (Eng.). A native tree whose fruit is edible, found in the Visayan Islands and Luzon.
- Dipterocarpus grandiflorus*, Blanco.—Aptong, Hapitong. A tall tree which yields excellent resin; sold in Manila market and exported; used for varnishing. Found in Luzon, Visayan, and Mindanao islands.
- Dipterocarpus malaanonan*, Blanco.—Malaanonang. A large tree producing an aromatic resin used for calking.
- Dipterocarpus pilosus*, Roxb.—Hagachac. A resinous big tree found in Mindanao, Visayan, and Luzon islands.
- Dipterocarpus turbinatus*, Gaertn.—Mayapis. A tall resin-yielding tree, found throughout the archipelago.
- Dipterocarpus vernicifluus*, Blanco.—Balao (T.); Malapaho (T. V.). A tree growing wild in parts of Luzon, Mindanao, and the Visayan Islands, yielding a resin used for varnishing, calking ships, and illuminating.
- Dolichos echinulatus*, Blanco.—Quibal. An herbaceous vine produced in Batangas as a garden vegetable. The fruit is edible.
- Dolichos sesquipedalis*, Linn.—Camangex (Il.); Camangian (P.); Otong; Sitao (T.); Long Yard Bean (Eng.). A twining plant, found throughout the archipelago and cultivated as a garden esculent. The green pods and dry beans are edible.
- Dracontomelum* Sp.—Alanihao (V.). A native tree, 90 feet or more in height, found in Romblon. The fruit is edible.
- Eugenia jambolana*, Lam.—Dujat (T.); Lombuy (V.); Lomboy (Sp.); Lumboy (T.); Jambolan or Jambolan Plum (Eng.). A tree found in both a wild and a cultivated state on Luzon and other islands. The fruit is used for dessert.
- Eugenia jambos*, Linn.—Tamboy (T.); Rose Apple, Jamrosade (Eng.). A tree raised as a garden product in Cebu, Luzon, and Panay. The fruit is edible and is used for making jelly.
- Eugenia malaccensis*, Linn.—Macopa, Macupa (T.); Yambo (P.); Poma-rosa (Cuba); Otahelte Apple (Eng.). A tree about 30 feet high, a garden product of Luzon and other islands. The fruit is edible.

- Euphoria litchi*, D. C.—Allpai (T.); Alopay, Alpay, Alupay, Alupe; Lechia (Sp.). A native tree of Luzon and other islands, yielding an edible fruit.
- Ficus glomerata*, Roxb.—Tibig na lalaqui; Cluster Fig. A shade tree growing by the streams of Luzon. The fruit is small and is much relished by children, and also by cattle. The tree is highly valued by the natives, for the reason that the roots yield drinking water.
- Feniculum vulgare*, Gaertn.—Anis Estrellado (Sp.); Fennel (Eng.). A perennial plant, raised in very small quantities, but found throughout the archipelago. The seeds are used for dressing, sweetmeats, etc.
- Garcinia mangostana*, Linn.—Mangostan (T. Sp.); Mangosteen (Eng.). A tree growing on Jolo and Mindanao islands and known by the name of "King's Fruit." The fruit is sweet and has a very delicate flavor. It is much prized.
- Hermandia peltata*, Meisen.—Colong colong (T.). A native tree found in Luzon. Oil is made from the nut.
- Heptapleurum caudatum*, vid.—Limolimo. Yields a resin used for making varnish.
- Homalanthus populifolius*, R. Grah.—Balante. A tree whose bark when dried and reduced to a powder yields black coloring matter used by the natives.
- Hopea plagata*, vid.—Yacal. A lofty tree yielding transparent resin.
- Indigofera tinctoria*, Linn.—Ameri (B. C.); Mariana, Tagom, Tagum (V.); Tayom (T.); Tayung (P.); Afili (Sp.); Indigo (Sp. Eng.). A small leguminous shrub about 5 feet in height, grown in Luzon and other islands. The entire plant, with the exception of the roots, furnishes a blue dyestuff known as indigo, which is much used in the industries. It is also raised to a considerable extent in Ilocos and Pangasinan, where the plant is known by the name of Indigo.
- Ipomea batatas*, Poir.—Camote, Camoti (T.); Sweet Potato (Eng.). A trailing vine, many varieties of which are largely cultivated throughout the archipelago and constitutes a staple product. The tuberous root and the leaves and shoots are the parts used.
- Jasminum sambac*, Linn.—Sampaguita. A plant with white, fragrant flowers, from which a highly prized essence is produced.
- Jatropha curcas*, Linn.—Casla (V.); Tava-tava, Tawatawa (Il.); Tuba (T.); Physic Nut or French Physic Nut (Eng.). A native shrub, about 8 feet high, found wild and planted for fences throughout Luzon and other islands. The fruit is used for making oil and is purgative.
- Jatropha multifida*, Linn.—Mana (T. Sp.). A shrub growing wild in Bulacan and Rizal, though sometimes planted. The fruit is used and is a purgative.
- Justicia corrosiva*, Linn.—Atay-atay (V.). A shrub planted in gardens for ornament; the leaves are used medicinally. It is found in the Visayan Islands.
- Labiab cultratus*, D. C.—Batao (T.); Bulay (P.). A vine raised in small quantities in Albay, Bulacan, Occidental Negros, Nueva Ecija, Rizal, Tarlac, and Zambales. The fruit is used as a vegetable.
- Lactuca sativa*, Linn.—Lechuga (Sp.); Lettuce (Eng.). A garden vegetable locally raised throughout the archipelago. The leaves are used for making salad.
- Lansium domesticum*, Linn.—Boboa (T.); Boocan; Bulahan (T.); Lanson (V.); Lanzones (Sp. T.). A small tree of beautiful appearance, 15 feet or more in height, found in Luzon and other islands. Cultivated to a large extent in Laguna Province, and is very highly esteemed. The fruit is eaten raw and prized as a dessert.
- Leersia hexandra*, Swartz.—Barit (T.); Zacate (Sp.). A grass which is cut by hand and sold green for feed for horses. An important industry in Manila.
- Limonia trifoliata*, Linn.—Limoncitos. A shrub, about 8 feet in height, growing spontaneously in Luzon and other islands. The fruit is esteemed for seasoning sweetmeats. Same as *Triphasia trifoliata*, D. C.
- Lucuma mamosa*, Gaertn.—Mamey (T.); Chico Mamey (Sp.); Marmalade plum (Eng.). A tall shrub growing in gardens in Laguna, valued for its fruit.
- Luffa acutangulus*, Roxb.—Patola (T.); Sponge Cucumber (Eng.). Cultivated as the following variety, for local consumption. The matted fibers of the fruit of this variety or the following one are being exported from Japan for lining hats and slippers.
- Luffa aegyptiaca*, Mill.—Patola (T.); Sponge Cucumber (Eng.). An annual tendril-climbing plant, raised as a garden vegetable throughout the archipelago. The green fruit is edible and is cooked like squash or served in soups and stews.

- Lycopersicum esculentum*, Mill.—Camatis (T.); Tomate (Sp.); Tomato (Eng.). An herb of American origin, of which several varieties are raised throughout the archipelago. The fruit is utilized for dressing, sweetmeats, etc., and is eaten raw or cooked.
- Mangifera altissima*, Blanco.—Paho, Pajo (T.); Pao. A tree grown to a small extent in Luzon and other islands. The fruit is highly prized and is utilized for pickling, etc.
- Mangifera indica*, Linn.—Mampalam (J. M.); Manga (T.); Manga (Sp.); Mango (Eng.). A tree 30 to 50 feet in height, grown to a large extent throughout the entire archipelago. The fruit is harvested during spring and summer and is highly esteemed for dessert, jelly making, etc.
- Manihot utilisima*, Pohl.—Camoteng cahoy (T.); Adam's Needle, Cassava or Yucca (Eng.). A shrub, about 10 feet high, of American origin. The well-known tapioca is extracted from the starchy fecula of its roots. It is found both wild and cultivated in some provinces. The natives make a good sweetmeat of the roots, which finds a ready sale among them.
- Maranta arundinacea*, Linn.—Ararao (T.); Araro (V. P.); Bermuda Arrowroot (Eng.). An herb sometimes grown for local use in Luzon and other islands. The starchy roots are used for making arrowroot and sago.
- Melastoma polyanthum*, Blume.—Agulsip. A tree, from the bark of which a bright red coloring matter is extracted. It is used to dye hemp clothes.
- Memecylon tinctorium*, Pers.—Candong (Il.); Collis (T.); Sagulnsin (V.). A tree growing spontaneously in Luzon and Visayan islands. The leaves are used for dyeing purposes.
- Metroxylon rumphii*, Mart.—Bagsang. A very common palm in the Visayan Islands; grows spontaneously in moist regions. The heart of the tree is reduced to a sort of flour, which is made into cakes or fritters and eaten with cocoanut milk; a wholesome and nutritious food.
- Metroxylon silvestre*, Mart.—Lumbia or Lumbay. A palm from which a sort of flour is obtained, which serves as food to the poorer classes in times of scarcity.
- Mezoneurum glabrum*, Desf.—Cablitcabag, Sagnit, Sapnit; Togabang (V.); Tugabang; Ugabang (V.). A woody vine found on Luzon and the Visayan islands, though not cultivated. The tender stems are cooked and used for making salad; the leaves are used medicinally.
- Michelia champaca*, Linn.—Champaca. A tree, 15 feet high, cultivated in gardens. A fine essence is extracted from its flowers.
- Mimusops elengi*, Linn.—Cabiqui (T.). A native tree, about 40 feet high, found on Luzon and other islands, whose fruit is edible and the flowers of which are very fragrant. It is sometimes planted in gardens.
- Momordica balsamina*, Linn.—Ampalaya, Ampalea (T.); Apale, Apalia (V.); Palaya (B.); Palla, Paria; Amargoso, Balsamina (Sp.); Balsam Apple (Eng.). An annual climbing herb, raised for local consumption in Luzon and other islands. The fruit and leaves are used as condiment for salad, etc.
- Morinda tinctoria*, Roxb.—Bancuro. A tree whose root produces a red coloring material, used for dyeing purposes.
- Morinda umbellata*, Linn.—Saliciscan.—A tree from the roots of which the natives extract a red dyestuff.
- Moringa oleifera*, Lam.—Arongay (Il.); Arungay (P.); Balongay, Balungay (V.); Camalongay, Camalugay; Malungay (T.); Marungay (Il. V.); Horse-radish tree (Eng.). A native tree, about 15 to 25 feet high, found wild throughout almost the entire archipelago; sometimes planted for its fruit, leaves, shoots, and roots, which are used for various purposes.
- Muntingia calabura*, Linn.—Dátiles, Ratiles (T.). A small tree, about 15 feet high, of American origin, growing spontaneously in Luzon Island. The fruit is edible, though seldom used.
- Musa paradisiaca*, Linn. var.—Saguing (T.); Platano (Sp.); Banana (Eng.). The native name for all kinds of bananas is "Saguing."
- Musa paradisiaca*, Blanco.—Bisco; Saba (T.); Saba Iloco; Platano (Sp.); Banana (Eng.). A variety of banana raised on a commercial scale throughout the archipelago.
- M. paradisiaca locatan*, Blanco.—Lacatan (T.); Platano (Sp.); Banana (Eng.). A variety of banana grown in Luzon and other islands for its fruit, which is highly prized. It is claimed to be one of the best varieties on account of its superior flavor.
- M. paradisiaca magna*, Blanco.—Tondoc (T. V.); Tunduque (T.); Plantano (Sp.); Banana (Eng.). A variety of banana tree grown on a small scale in Luzon and other islands as a garden product. The large fruit is edible.

- M. paradisiaca maxima*, Blanca.—Batavia (T.); Matavia (V.); Platano (Sp.); Banana (Eng.). Banana tree, found in Luzon and other islands and valued for its fruit.
- M. paradisiaca suaveolens*, Blanco.—Bungulan (T.); Platano (Sp.); Banana (Eng.). A variety of banana widely grown for its fruit.
- M. paradisiaca ternatensis*, Blanco.—Gloria (T.); Taranate (P.); Ternate (T.); Platano (Sp.); Banana (Eng.). A high tree-like herb very much appreciated and cultivated extensively for its valued fruit. Common in central Luzon.
- Myristica Philippinensis*, Lam.—Anis cahoy (T.); Nuez moscada (Sp.); Nutmeg (Eng.). A tree found growing naturally in Cavite, Laguna, and Cebu Island. The fruit or nut is used as a condiment.
- Nicotiana tabacum*, Linn.—Tabaco (Sp. T.); Tobacco (Eng.). An herb, 3 to 5 feet high, of American origin, growing in Luzon and the southern islands, the best being that grown in Isabela and Cagayan. Many varieties are largely produced and exported to foreign markets. The leaves are used for making cigars, cigarettes, etc.
- Nipa fructicans*, Wurm. —Nipa (Sp. T.); Sasa (T.). A marsh plant, one of the most useful trees, growing throughout the archipelago. The sap or "tuba" is largely used for making wine and alcohol; the leaves for roof making, etc. The tuba when much fermented may be used as vinegar.
- Ochrocarpus pentapetalus*, Blanco.—Pamitlain, Pamitlatin. A tree growing in northwestern Luzon. The seeds yield an oil used for illuminating purposes.
- Oryza sativa*, Linn.—Humay; Palay (T.); Arroz, Palay (Sp.); Rice, Paddy (Eng.). A cereal, hundreds of varieties of which are extensively cultivated throughout the archipelago. The grains especially are used for food and form a staple product.
- Pachyrhizus angulatus*, Rich.—Camas (B.); Hincamas (T.); Incamas (P. Pn.); Jincamas (T.); Kamas (Il.); Sincamas (T.); Tincamas (V.); Yam bean (Eng.). An herbaceous vine grown to a large extent in Luzon, etc. The tuber is eaten raw or cooked.
- Parkia roxburghii*, G. Don.—Cupang. A resin useful for illuminating is extracted from this plant.
- Phalaris canariensis*, Linn.—Alpiste (Sp.); Canary Grass, Canary Seed (Eng.). A grass grown rather for ornament in Abra, Ilocos Norte, and Ilocos Sur. The grain is used for feeding canary birds.
- Phaseolus*, Sp.—Agayac (C.); Agayap (T. Pn.); Beans (Eng.). Beans found in Cagayan; raised in small quantities for local use.
- Phaseolus lunatus*, Linn.—Azabache, Zabache (T.); Frijoles (Sp.); Beans (Eng.). A vegetable found in Batangas and other places, though it is rarely cultivated. The fruit is used for food.
- Phaseolus lunatus inamorus*, Linn.—Patane (T.); Sleva or Clivet Bean (Eng.). A climbing plant growing on Luzon and Panay islands, etc. The seeds are used as an article of food for local consumption.
- Phaseolus mungo*, Linn.—Balatong, Mungo (T.); Mongo (Sp.). An herb, 3 feet high, grown on a commercial scale throughout the archipelago. The seed constitutes an article of food and is a staple product.
- Phaseolus vulgaris*, D. C.—Butinga (T. P.); Habas (Sp. T.); Beans (Eng.). A vegetable raised for local consumption only in Batangas and Pampanga.
- Phyllanthus distichus*, Mull.—Bangquilling (T.); Iba (T. P.); Layohan; Paras (V.); Otaheite Gooseberry (Eng.). A tall shrub or small tree, about 20 feet in height, grown in gardens. The fruit is used for pickling and preserves and is sometimes eaten raw.
- Pinus insularis*, Endl.—Affords resin used for lighting. Found in Luzon.
- Pinus mercurii*, Jungh.—A tree producing a resin used by Igorots for illuminating purposes.
- Piper betle*, Linn.—Ikmo, Itmo (T.); Mam-in (P.); Mamon (V.); Samat (P.); Buyo (Sp.); Betle (Eng.). A climbing plant found in Luzon and other islands. It is raised to a large extent in Pasay, Rizal Province, and some other places. The leaves are used for chewing only, together with a piece of betel nut and a bit of lime.
- Piper nigrum*, Linn.—Malisa (P. Il.); Paminta, Pimenta (T.); Pimlenta (Sp.); Black Pepper (Eng.). A shrub growing in Luzon and Panay islands, though rarely cultivated at present. Formerly extensively grown in Batangas. The fruit is used as a spice.

- Pisum sativum*, Linn.—Chicharo (T. Sp.); Guisante (Sp.); Peas (Eng.). A tendrill-climbing herb, grown as a garden vegetable in Batangas, Bulacan, etc.
- Pithecolobium dulce*, Benth.—Camachile (T.); Camanchile (T. Il.); Camansile (T.); Damortis (Il.). A tree, 25 to 40 feet in height, found on Luzon Island, having been introduced from America. It grows spontaneously and the fruit is edible. The bark is used for tanning purposes, and charcoal made from the wood is used in manufacturing gunpowder.
- Portulaca oleracea*, Linn.—Ansiman, Colasiman (T.); Olasiman, Verdolaga (Sp.); Purslane, Pusley (Eng.). A trailing weed found throughout the archipelago, but not cultivated. The stem and leaves are edible and are used as a salad.
- Psidium guayava*, Linn. var.—Bayabas, Tayabas (T.); Guayava (Sp.); Lemon guava (Eng.). A tree or shrub, 10 to 20 feet high, of American origin; found throughout the Philippine Islands. The fruit is valued for making jellies and preserves, and is used both locally and commercially.
- Psophocarpus tetragonolobus*, D. C.—Calamismis (T.); Camaluson (V); Kalamismis (T.); Pal-lam (Il.); Pallang, Seguidillas (T. Sp.). An herbaceous vine grown as a garden vegetable. It is found in Luzon and Panay islands, and grows wild in some places. The young pods are used for a condiment, salads, etc.
- Punica granatum*, Linn.—Dallma (J); Granada (Sp. T.); Pomegranate (Eng.). A shrub, about 10 feet high, found in Luzon, Jolo, etc. The fruit is edible, but the shrub is planted in gardens rather for ornament.
- Raphanus sativus*, Linn.—Labanos (T.); Rabano (Sp.); Radish (Eng.). A vegetable grown to a large extent throughout the archipelago. The root is edible.
- Rhamnus* Sp.—Cabatete (Il.); Cabatiti (Il. Pn.). A shrub, 9 to 12 feet high, found in Nueva Vizcaya. Very seldom used, though the leaves are edible.
- Rhizophora mucronata*, Lam.—Bakao, Bakawan (T.); Mangle (Sp.); Mangrove (Eng.). A small tree growing in mangrove swamps throughout the islands. The bark, fruit, etc., are utilized for dyeing and tanning purposes. The wood is much used as firewood.
- Ricinus communis*, Linn.—Lansina, Linancina; Tangantangan (T.); Palma Cristí, Ricino (Sp.); Caster Oil plant (Eng.). A shrub growing spontaneously nearly all over the islands of Luzon, Visayas, and Mindanao, forming dense jungles. The seeds yield an oil much prized in commerce.
- Saccharum officinarum*, Linn.—Tubo (T.); Caña dulce (Sp.); Sugar cane (Eng.). A tall grass, 8 to 15 feet high, several varieties of which are extensively cultivated throughout the archipelago, especially in Pampanga and Negros. Sugar made from the juice of the stalks forms a staple product, being largely exported.
- Sandoricum indicum*, Cav.—Santol. A tall tree grown in gardens throughout the archipelago. Valued for its fruit, which is utilized for dessert, preserves, etc.
- Sesamum indicum*, Linn.—Linga (T.); Ajonjolí (Sp.); Sesame, Beneseed, Gingly, Til or Teel (Eng.). Two varieties of this important herb are raised in small quantities upon Luzon and other islands. The seeds are used for making oil and seasoning soups, pastries, confections, etc.
- Sesbania grandiflora*, Pers.—Catoday (Il.); Catuday (T. Il.); Caturay (P. Il.); Katuday (Il.). A native tree, 20 to 30 feet high, growing in Luzon. The flowers are used for salad, etc., and the resin medicinally.
- Sesuvium portulacastrum*, Linn.—Bilang bilang (V.); Carampalit (P.); Dam-palit (T.); Tarumpalit. A succulent branching herb, found in Luzon and other islands. The stems and leaves are used as a vegetable, especially for pickling.
- Setaria italica*, Beauv.—Bicacao (V. T.); Bucacao (Il.); Mijo (Sp.); Millet (Eng.). A cereal found in Luzon, Cebu, etc., though rarely cultivated. The grains constitute an article of food.
- Sinapis brassicata*, Blanco.—Pechay (T.). An herb grown as a garden vegetable in Luzon and other islands. The leaves are used.
- Sinapis juncea*, Blanco.—Mostaza (Sp. T.); Mustard (Eng.). A vegetable growing in the gardens throughout the archipelago. The leaves and seeds are used for condiment, etc.
- Solanum melongena*, Linn. var.—Talong (T.); Berengena (Sp.); Egg-Plant (Eng.). An herb, 3 feet high, cultivated as a garden vegetable, for local consumption only, throughout the archipelago.

- Solanum tuberosum*, Linn.—Batata (T.); Papa, Patata (Sp.); Potato, Irish Potato (Eng.). A vegetable of American origin, found in Luzon and other islands. It is raised to a considerable extent in Benguet. The tuberous root is used as an article of food.
- Sorghum saccharatum*, Moench.—Batad (V.); Batag; Sorghum (Eng.). A grass found in Iloilo, Masbate, Abra, etc., though rarely cultivated. The stem yields sugar; and the roots and seeds are also utilized. Alcohol can be obtained from this plant.
- Tacca pinnatifida*, Forst.—Canobong (V.); Panarien (Pt.); Parnarien (Il.); Tayobong (V.). A shrub, 6 feet or more high, cultivated in Antique, and very common in Ilocos and Zambales. The tuberous root is utilized in making a flour called "gaogao," sold in the Manila markets.
- Tamarindus indica*, Linn.—Samalagui, Sambag, Sambagui, Sambalagui (V.); Sampaloc (T.); Tamarindo (Sp.); Tamarind (Eng.). A tall tree, about 30 feet or more in height, grown to a limited extent in Luzon, the Visayan Islands, etc., and valued for its fruit, the meat of which is edible and serves for making preserves, syrup, dressing, etc.
- Terminalia catappa*, Linn.—Dalisay, Talisay; Almond (Eng.). A tree, 30 to 40 feet high, growing spontaneously throughout the archipelago. The seeds are edible and are known as native almonds.
- Theobroma cacao*, Linn.—Cacao (Sp. T.); Cocoa (Eng.). A shrub or small tree of great importance found throughout the archipelago, introduced from America in the sixteenth century. It is grown to a large extent and the fruit is edible. The seeds are used for making chocolate. Large quantities of cacao of excellent quality are produced in southern Mindanao and district of Davao.
- Triphasia trifoliata*, D. C.—Limon suti. A shrub, growing spontaneously in Jolo, Mindanao, Luzon, and Panay. The fruit is used for dressing, etc.
- Triticum vulgare*, Willd.—Trigo (Sp.); Wheat (Eng.). A cereal grown in Batangas, Cagayan, Cavite, and Ilocos Norte, though rarely planted at present. The grain is used for making flour, which is made into bread.
- Vatica mangachapuy*, Blanco.—A tree of medium size, which yields resin.
- Vitis* Sp.—Uvas (Sp.); Grape (Eng.). A vine raised or planted in gardens in Albay, Ilocos Norte, etc., but rather for ornament than for fruit. The fruit is, however, used.
- Zea mays*, Linn.—Mais (T.); Maiz (Sp.); Corn (Eng.). A cereal introduced from America, many varieties of which are cultivated throughout the archipelago. The grains are utilized for food, being a staple product.
- Zingiber officinale*, Linn.—Baseng (Il.); Loyal (M.); Luya, Luy-a; Pangas (M.); Jengibre (Sp.); Ginger (Eng.). A vegetable grown in Luzon and other islands for local consumption. The tuber or root is the part used for dressing or as a spice.
- Zizyphus jujuba* Lam.—Manzanitas (Sp. T.). A tree, planted in gardens in Cavite, Ilocos Norte, etc., yielding an edible fruit.

NOTE.—B., Bikol; C., Cagayan; Il., Ilocano; J., Jolo; M., Mindanao; P., Pampanga; Pn., Pangasinan; T., Tagalog; V., Visayan; Z., Zambales.

(From Report of the Philippine Commission, 1903, vol. 2, pp. 677-697.)

AGRICULTURAL CONDITIONS RELATIVE TO VALUE OF LANDS, WAGES OF FARM LABORERS, PRINCIPAL CROPS, ETC., IN THE PROVINCES.

Many letters have been received by the bureau requesting information as to the availability and prices of lands, the wages of farm laborers, and the principal crops in the various provinces, presumably with the view of making investments. In order to answer our correspondents intelligently, a circular letter of inquiry was addressed to officials in the provinces covering the points in question, and, as there appears to be a general demand for information along these lines, the replies so far received are here presented in full.

PROVINCIAL GOVERNMENT OF PANGASINAN.

LINGAYEN, July 14, 1903.

SIR: In reply to your circular letter of July 10, 1903, I have the honor to inform you as per your notations.

First. Relative to private lands which might be obtained by purchase and the price per hectare.

In answering this question, it will only be necessary to consider cultivated land as divided into two general classes—that is, rice land and sugar land. Rice land embraces all or the major portion of the lowlands of the provinces, or land that may be easily irrigated, or is subject to inundation to a greater or less degree at certain seasons of the year. The better quality of this land may be had at prices ranging from \$150 to \$200 Mexican per hectare. The sugar land will embrace all land not subject to inundation, although much of it is susceptible to easy irrigation. This class of land may be purchased at from 100 to 150 pesos per hectare. Uncultivated land, whether high or low, that will bear the distinction of arable land, may be bought for 25 to 50 pesos per hectare. I will state, in this connection, that prices in general for land here seem to be based rather more upon the financial necessity of the owner than upon the real natural value of the land itself. However, the price given will, I think, be found to represent the average prevailing at this time.

Second. What are the wages usually paid ordinary farm laborers?

The farm laborer does not receive a wage, in the usual sense as we use it. All agricultural work is done on the share-and-share system. The large land owner sometimes advances money to his laborers, but rather more frequently his advances are confined to the food required by the laborer and his family. When the crops are harvested these advances are returned from the portion of the yield belonging to the laborer, which constitutes his hire. I am told that if one were to attempt to hire labor of this class it would be necessary to pay 50 cents Mexican per day and food in addition.

Third. What are the principal money crops, and could these crops be advantageously increased?

The principal money crops of this province are rice, sugar, nipa, corn, indigo, cocoa, and tobacco. Under certain conditions these crops could be enormously increased.

Your fourth question, "Can you give an estimate of the amount of income derived from the crops at the present time?" is rather a difficult one to answer. There are no statistical data to base an estimate upon, but from the best information obtainable I would say that the products of the soil in this province are yielding at this time an annual income of from 8,000,000 to 10,000,000 pesos.

Fifth. What obstacles, if any, must be overcome in order to secure larger crops or greater agricultural activity?

This question is a broad one, and I am afraid I can do it but poor justice. Larger crops, in the initial sense, could be secured if there were more labor

and animals at the disposal of the planter, and naturally greater agricultural activity would follow; but if the best results are to be obtained and land already under cultivation brought to a higher state of efficiency methods must be changed, and here is where the deepest water and the most obstinate opposition will be encountered. Just now the most depressing local conditions are the scarcity of animals and the abundance of locusts, and, perhaps, after all, if these obstacles were removed, conditions might be so improved as to bring the solution of the greater problem at least within the bounds of a possibility.

Respectfully,

C. F. VANCE, *Provincial Supervisor.*

Prof. F. LAMSON-Scribner,
Chief Bureau of Agriculture, Manila, P. I.

PROVINCIAL GOVERNMENT OF PANGASINAN.

LINGAYEN, August 14, 1903.

SIR: In reply to your letter of the 10th ultimo, I have the honor to send you the following information:

First. It is believed that private lands can be purchased here at the price of \$50 to \$100 Mexican per hectare.

Second. Laborers' wages are 50 cents a day.

Third. The most profitable crops in this province are rice in the first place, and tobacco, sugar cane, and cocoanuts in the second, all of which could be advantageously increased.

Fourth. It is estimated that rice is grown at a profit of 15 per cent, and that 15 per cent to 20 per cent is obtained from the production of other crops.

Fifth. At present, the greatest obstacle to be overcome is the lack of draft animals and the swarms of grasshoppers.

The above information has not been furnished earlier on account of having to await reports from the several towns of this province.

Respectfully,

M. FAVILA, *Provincial Governor.*

Prof. F. LAMSON-Scribner,
Chief Bureau of Agriculture, Manila, P. I.

PROVINCIAL GOVERNMENT OF ALBAY.

ALBAY, July 22, 1903.

SIR: I am in receipt of your circular letter of the 10th instant, requesting certain information and, in reply, have the honor to state the following in answer to your questions:

First. Fully 80 per cent of the male adults of this province are landowners. This land can be bought by purchase, the price varying from \$5 to \$200 Mexican per hectare.

Second. The average wages paid for day labor varies according to the class of labor; the ordinary day laborer receives 1 peso per day; carpenters, \$2.50; stone masons, \$2; hemp workers are compensated by receiving one-half of the amount of hemp fiber they produce per day, this varying from 4 to 8 pesos per day—that being the portion due to the laborer.

Third. The principal crops of this province are hemp, copra, and rice.

Fourth. During the past year the province produced in the neighborhood of \$12,000,000 Mexican worth of hemp; copra, in the neighborhood of \$1,000,000. Rice—this crop was very short, owing to the lack of carabao. The present year, however, at least one-third of the sementeras (rice lands) of the province have been put under cultivation.

Fifth. The greatest obstacle in this province at present to the increasing of the present output of its products is the lack of labor, there being many thousand acres more hemp under cultivation than there are laborers to extract the fiber. Labor and transportation are the two great drawbacks in the province.

Trusting the above is the information desired, I remain,

Respectfully,

A. U. BETTS, *Governor.*

Prof. F. LAMSON-Scribner,
Chief Bureau of Agriculture, Manila, P. I.

PROVINCIAL GOVERNMENT OF ANTIQUE.

SAN JOSE, *July 27, 1903.*

SIR: In reply to your letter dated July 10, 1903, I have the honor to give you the following information regarding Antique Province:

First. Private lands can be obtained in almost any quantity at from \$50 to \$150 Mexican per hectare.

Second. Ordinary farm laborers are generally paid from 20 to 30 cents Mexican per day.

Third. The principal money crops in this province are rice, sugar cane, and some hemp.

Fourth. I am unable to give you an estimate of the amount of income derived from these crops, but will state that the profits are very good.

Fifth. The only obstacles that I know of to be overcome in order to secure larger crops are the scarcity of work animals and the lack of improved farm implements. The soil seems to be especially adapted to the culture of rice and sugar cane, though stock raising would be a profitable business on account of the vast grazing lands throughout the province.

Respectfully,

B. F. REAMY, *Supervisor-Treasurer.*

Prof. F. LAMSON-Scribner,
Chief Bureau of Agriculture, Manila, P. I.

PROVINCIAL GOVERNMENT OF BATAAN.

BALANGA, *July 28, 1903.*

SIR: In reply to your letter of July 10, I have the honor to reply as follows to the various questions:

First. Yes; from \$100 to \$280 local currency per hectare. Many are anxious to sell at this time on account of the land tax, locusts, and other causes.

Second. Fifty cents local currency per day, without board; with board, 40 cents local currency.

Third. Sugar and rice. Improperly called "money crops," as not enough is produced for home consumption. In former times, however, large quantities of sugar were sold.

Fourth. Practically none sold outside of the province.

Fifth. Natives claim that there is a lack of carabao. However, except in one or two towns of the province, there are plenty of animals for present needs. I have never had any trouble in getting carabao carts for road work at from \$1 to \$1.50 local currency per day. In my opinion, there is a great need of capital in order to revive the agricultural interests. Many who would work have no capital for the necessary outlay to plant and gather the crop.

The general use of new seeds would materially aid those who plant at present corn, sugar cane, and new rice.

Respectfully,

C. D. Wood, *Supervisor.*

Prof. F. LAMSON-Scribner,
Chief Bureau of Agriculture, Manila, P. I.

PROVINCIAL GOVERNMENT OF BENGUET.

BAGUIO, *August 3, 1903.*

SIR: In answer to your letter of July 10, 1903, I have the honor to make the following replies:

First. There are no private lands in this province worth mentioning which could be obtained by purchase; Benguet is almost entirely government land.

Second. There are no farm laborers; every man cultivates his own land, with the aid of his servants, if he happens to have any; they could hardly be called farm laborers.

Third. The principal money crops of this province consist of only coffee and potatoes.

Fourth. Ten thousand dollars Mexican is a fair estimate of the income derived from these crops at the present time.

Fifth. The only obstacle to overcome in order to secure larger crops is transportation.

Respectfully,

WM. F. PACK, *Governor.*

Prof. F. LAMSON-Scribner,
Chief Bureau of Agriculture, Manila, P. I.

PROVINCIAL GOVERNMENT OF BOHOL.

TAGBILARAN, July 29, 1903.

SIR: In answer to your communication of July 10, I have the honor to report:
First. That there are private lands in this province which can be bought at about \$15 Mexican per hectare.

Second. The wages paid farm laborers are 10 cents to 20 cents Mexican per day, with board.

Third. That the principal crops at present are abaca and copra, and that rice, cotton, coffee, cocoa, sugar, and tobacco could be raised in addition.

Fourth. That I can not give an estimate of the income derived from the various crops.

Fifth. That the difficulties to farming at present are the billions of locusts, which breed undisturbed in the grassy plains of the northern part of the province, lack of draft animals, lack of good irrigation system, lack of good roads connecting the interior with the coast, and the very antiquated methods of farming in the province.

Respectfully,

JACOB C. MULDER, *Supervisor.*

Prof. F. LAMSON-Scribner,
Chief Bureau of Agriculture, Manila, P. I.

PROVINCIAL GOVERNMENT OF ILOILO.

ILOILO, July 16, 1903.

SIR: In reply to your circular of July 10 would say:

First. There are plenty of private lands in this province that can be bought at the present date. The price of the same will be according to the class of land. If it is first-class sugar land or first-class rice land, it will sell on an average of \$40 gold per hectare between the natives; but if a person from the outside tries to buy the price is generally higher. The people class the land as to number of times it has to be plowed and its location to river and elevation. That which is near a river, where the river can overflow its banks and leave the rich deposit on the land, is the first class. Then that which has to be plowed a number of times are the other classes. Finally, the last is that which they call grazing land, and they value it at about \$5 gold per hectare. Prices between the first and last classes vary from the first price given to the last.

Second. As far as I know, the wages paid on the haciendas here are \$1 local currency per week and a place to live and two rations a day. That is the general rate, but there are some who pay less.

Third. The principal crops here are sugar, rice, and tobacco, and a little hemp. They could be advantageously increased a great deal.

Fourth. I can not give you any information regarding this question, as I would be very greatly in error, and would not make a statement.

Fifth. The obstacles to be overcome to secure larger crops or greater agricultural activity are many. The native must do more work than he does. He must be taught the difference between plowing with a stick and plowing with a plow, which will uproot the weeds and give the sun a chance to kill them. Draft animals must be kept in the province, instead of being shipped out all the time. Brigandage retards the cultivation of the country, as a man must live in the town and go to his little ranch every day and return where he can have some degree of safety. From my observations the natives have very little idea of the cultivation of the products. Knowing how to cultivate them and using farming implements of the right kind, the crops could be doubled easily.

I should judge that at least 50 per cent of the cultivable ground of this province is idle, this from shortage of draft animals.

Respectfully,

E. S. WHEELER, *Supervisor.*

Prof. F. LAMSON-Scribner,
Chief Bureau of Agriculture, Manila, P. I.

PROVINCIAL GOVERNMENT OF ISABELA.

ILAGAN, August 18, 1903.

SIR: I have the honor to reply as follows to your letter of July 10, 1903, in reference to lands, crops, etc., in this province, answering the questions in the order in which you present them:

First. There are large lots of private lands in Isabela which may be bought at from \$20 to \$40 United States currency per hectare, depending upon location; i. e., whether overflow land, on which tobacco best grows, or land higher up, suited to corn, etc. Titles are very unsatisfactory, however, owing to the former system of registration.

Second. There is scarcely such a thing as hired farm labor known in the province. Each family owns a small tract of ground and raises its crop of tobacco and maize or works the lands of individuals or companies on shares. The province pays 50 cents Mexican per day at present for ordinary labor, but this is for a better class of men than the average, and the price is considered high.

Third. The only money crop is tobacco. Every family in the province raises it, and the trouble about increasing the output is shortage of labor. Vast tracts of valuable private lands are lying idle for want of tenants, to say nothing of the state lands that could be taken up were they needed. It is safe to say that Isabela Province could support five times the present population without difficulty.

Fourth. The approximate value of the tobacco crop of Isabela is \$1,000,000 local currency per year.

Fifth. The crying needs of the Cagayan Valley are labor and transportation. It is believed that with transportation labor would rush in, and the early construction of a railroad from Manila to Aparri would develop one of the most valuable sections of the Philippines.

Respectfully,

N. B. STEWART, *Supervisor-Treasurer.*

Prof. F. LAMSON-SCHIBNER,

Chief Bureau of Agriculture, Manila, P. I.

PROVINCIAL GOVERNMENT OF LAGUNA.

SANTA CRUZ, August 18, 1903.

SIR: I have the pleasure to reply to your official letter, dated the 10th ultimo, as follows:

First. There are plenty of agricultural lands in this province, but they can not be purchased, for the owners prefer to have their money invested in land in preference to having it invested where the gain is doubtful and where it is not so safe. Most of the people of Laguna are landowners and are interested in agriculture.

Second. Laborers are paid in the following manner: On cocoanut plantations it is customary for the laborers to receive one-fifth of the crop in payment of their work. In the case of sugar cane, abaca, rice, and others of minor importance, laborers receive only one-fourth of the crop; but as a rule his share amounts to one-fifth of the yield.

Third. The principal crops of this province are as follows: Cocoanuts, copra, sugar cane, rice, abaca, and others.

The yield of sugar cane and rice, which are the most valuable agricultural products of this province, has not been so large during these last three years as formerly, on account of the lack of animals, this preventing a great number of lands from being cultivated. The cocoanut and abaca plantations have not suffered so much, for they can be planted and kept under cultivation without animals.

Fourth. The yield of the crops can not be ascertained, or even estimated.

Fifth. Lack of animals and an abundance of grasshoppers, which play havoc with the plantations, are the principal obstacles to be overcome. When the farmers have acquired possession of more animals, and grasshoppers have disappeared through the cooperation of the people and local authorities, the agricultural conditions of this province will undoubtedly improve rapidly.

Respectfully,

JUAN CAILLÉS, *Governor.*

Prof. F. LAMSON-SCHIBNER,

Chief Bureau of Agriculture, Manila, P. I.

PROVINCIAL GOVERNMENT OF LAGUNA.

SANTA CRUZ, July 16, 1903.

SIR: In answer to your circular of July 10, 1903, I have the honor to reply as follows:

First. I know of no private lands for sale in this province. Have heard rumors of lands, which are not now under cultivation because of the lack of carabao, being on the market for sale, but can give no information as to prices.

Second. I am informed that laborers receive about 50 cents Mexican per day. Where they do work by contract, it is possible to earn \$1 Mexican per day.

Thlrd. The principal crops of this province are cocoanuts, hemp, rice, and sugar. Only a small part of the hemp, rice, and sugar lands are now under cultivation, the last two because of the want of farm animals.

Fourth. No; I understand that the profit for cocoanut trees will average about 1 peso per year.

Fifth. Supply of work animals must be increased. The people must be induced to settle and develop the hill country.

Respectfully,

DAVID A. SHERFEY, *Supervisor.*

Prof. F. LAMSON-SCRIBNER,

Chief Bureau of Agriculture, Manila, P. I.

PROVINCIAL GOVERNMENT OF LEYTE.

TACLOBAN, August 8, 1903.

SIR: In reply to the questions contained in your communication of July 10, regarding crops and agricultural lands in the province of Leyte, I have the honor to report as follows:

First. There are private lands which can be purchased, but it is extremely difficult to get at the prices which may be asked. The people have very little idea of the value of real property, and the prices are a matter of sentiment and not in any way based on the producing power of the land.

In talking with the presidente of Abuyog recently he stated that the price for tracts capable of producing 300 or 400 pesos' worth of hemp per year was 100 pesos, but that it was not "costumbre" in his town to sell land; that is, the land originally cost 100 pesos, and that had been the price ever since, should any one ask, but no one cared to sell.

The prices used by the tax boards for estimating values for the land-tax assessments varied from 2 cents local currency per square braza for uncultivated land to 5 and 10 cents for cultivated, according to location.

Second. Most of the labor (farm) is performed on the cooperative plan, the large landholders renting their property in small holdings for a certain percentage of the produce. A store is often run in connection, at which the tenant secures all his supplies on trust until such time as the crop matures. The owner is then paid his share of the crop and generally purchases the rest.

On the provincial roads the men are paid 50 cents Mexican per day for laborers, and 1 peso per day for section bosses, but they are very hard to secure at any price. At Tacloban the day laborers secure 1 peso per day, when they can be induced to labor at all.

In the hemp districts it is extremely difficult to get day laborers, as they prefer to go into the hemp fields and work on shares. At this work a man can earn enough in one day to keep himself and family for a week or more, and is, consequently, under no obligation to work the remaining time, and does not.

Third. The principal crops are hemp, copra, and some tobacco, and all of these could be much increased.

Fourth. The annual money value of the hemp crop is estimated at from \$8,000,000 to \$10,000,000 local currency and the copra at about \$500,000 Mexican. The tobacco is almost entirely used for home consumption.

Fifth. Lack of roads from the coast to the interior, over which the produce can be marketed, offer considerable obstacle to the increase in quantity of the crops, but the main drawback is the lack of energy on the part of the inhabitants themselves. Not much is done in the way of cultivation, and the present output is mostly made up of things that happen, and is not brought about through any assistance rendered by the people to a kind Providence.

Respectfully,

S. B. PATTERSON, *Supervisor.*

Prof. F. LAMSON-SCRIBNER,

Chief Bureau of Agriculture, Manila, P. I.

PROVINCIAL GOVERNMENT OF MINDORO.

CALAPAN, July 17, 1903.

SIR: Replying to your circular letter of July 10, I have the honor to submit the following:

First. Yes. The highlands, without timber, formerly sold for \$2 Mexican; the lowlands at \$25. Lands planted to cocoanuts, cocoa, coffee, or hemp, sold at prices agreed upon for each plant or tree.

Second. At present laborers furnishing their own tools and animals are paid 50 cents Mexican per day, with two meals. They were formerly paid half these wages.

Third. The principal money crops of the province are cocoanuts, hemp, and palay, which, with cocoa, coffee, corn, and other cereals, could be considerably increased.

Fourth. It is impossible to make an estimate at this time as a result of the loss of animals and failure of crops from drought and locusts.

Fifth. The only obstacle in the advancement of Mindoro is the lack of labor. It is my opinion, in which I am supported by the influential natives of the province, that the importation of Chinese is a necessity. The entire province might properly be called virgin soil.

Respectfully,

R. J. OFFLEY,

Captain, Thirtieth U. S. Infantry, Governor.

Prof. F. LAMSON-Scribner,

Chief Bureau of Agriculture, Manila, P. I.

PROVINCIAL GOVERNMENT OF NUEVA ECIJA.

SAN ISIDRO, July 25, 1903.

SIR: I have the honor to reply to your communication of the 10th instant as follows:

First. According to results of the census there are private lands in "haciendas," 148,626 hectares, 89 areas, 16 centiareas; in "solares" (gardens), not haciendas, 2,821 hectares. Official taxation per hectare is assessed according to the class of land, to wit:

	U. S. currency.
First -----	\$25. 00
Second -----	20. 00
Third -----	15. 00
Fourth -----	10. 00
Fifth -----	5. 00

The "solares" are not appraised per hectare, but according to the estimates furnished by the respective owners.

Second. In this province it is not customary to pay day wages to the field laborers; but 40 cents Mexican is, approximately estimated, a laborer's daily wage.

Third. The principal fount of wealth in this province is agriculture, chiefly that relating to the cultivation of palay, which undoubtedly must and can undergo greater development. It is at present in a state of great depression.

Fourth. For the present no estimate can be made of probable crops, for the reason that the majority of the farmers have been unable to plant seed beds even, owing to the backwardness of the rains. In 1902 the crop results were as follows:

Rice -----	cavans..	502, 906
Corn -----	ears..	20, 422, 009
Tobacco -----	bales..	5, 741
Sugar -----	pilonos..	221

Respecting crops of previous years—previous to 1902—the losses this year were 75 per cent in rice, 80 per cent in corn, 70 per cent in tobacco, and 95 per cent in sugar.

Fifth. Besides the need of opportune rainfall, owing to a lack of irrigated lands in this province, and the complete extermination of the locusts, there is also a great shortage in working animals.

There are at present 14,821 carabao, 25 per cent of which are useless for work. Before the war and the epizooty there were 35,000 useful carabao. We are, therefore, in need of 23,879 carabao to place this province in the same condition in which it was before the war and the appearance of epizooty. Before the war—that is, in the years 1890 to 1895—our crops amounted to:

Rice-----	cavans--	2,011,623
Corn-----	ears--	102,110,495
Tobacco-----	bales--	19,136
Sugar-----	pilones--	4,419

During the period of the tobacco monopoly this province yielded 200,000 bales in 1862, and in 1875 the crop was 70,800 bales.

Respectfully,

EPIFANIO DE LOS SANTOS CRISTOBAL, *Governor.*

Prof. F. LAMSON-Scribner,
Chief Bureau of Agriculture, Manila, P. I.

PROVINCIAL GOVERNMENT OF PAMPANGA.

BACOLOR, August 14, 1903.

SIR: In reply to your communication of the 10th ultimo, I have the honor to inform you that I have consulted all the presidentes in this province by letter in regard to your queries; but 10 have answered. The following is a résumé of information thus derived:

Private lands can be purchased in this province in the municipalities of Bacolor, Lubao, San Miguel, Candaba, Mexico, and San Fernando at from 5 to 250 pesos per hectare, according to the class and location.

Most of the laborers are tenants and work the fields on shares, receiving from one-quarter to three-fifths of the crop. Others are paid by the day; and, according to the presidentes' reports, receive from one-half to 1½ pesos per day. I think this price is excessive. I pay my road laborers 50 cents Mexican per day.

The presidentes gave me no information in regard to crops. From observation I find that sugar and rice predominate. Also small amounts of corn and indigo are cultivated.

The presidentes can give me no estimate of the values of crops.

Locusts, lack of carabao, dryness, inundations, lack of money, imperfect implements, lack of laborers, lack of irrigation, lack of regulations between proprietors and tenants, and lack of good methods of transportation seem, from the presidentes' reports, to be the chief impediments to procuring larger crops.

Respectfully,

N. P. CREAGER, *Supervisor.*

Prof. F. LAMSON-Scribner,
Chief Bureau of Agriculture, Manila, P. I.

PROVINCIAL GOVERNMENT OF PARAGUA.

CUYO, July 30, 1903.

SIR: I have the honor to acknowledge receipt of your circular letter of July 10, 1903.

First. I do not know of any private lands in the province for sale where the supposed owners can give a good and sufficient title for the same. One can buy the native's right to a piece of land, running the risk of ever obtaining a title for the land, for about \$10 Mexican per hectare.

Second. The price of labor varies greatly, depending upon circumstances. For example, a native will work for another native for less than for an American, because he does not have to work as hard. Labor can be obtained for from \$3 to \$5 Mexican per month, if they are not to be taken away from their homes or families. If they are to be taken away from the particular island or municipality in which they live, sometimes almost any price is necessary—at times as much as \$40 Mexican per month is necessary.

Third. The principal money crops are rice, copra, tobacco, and hemp. Many raise cattle. All of these could be largely increased if the public lands were surveyed and opened to settlement or purchase by people who will put money into land when they can obtain a good title to enough land to justify establishing a hacienda. People with money and brains are not going to put it into a 16-hectare farm; neither will they put in any improved machinery to cut 10,000 cubic feet of timber.

Fourth. Copra is about the only product except cattle where any more is produced than is used in the province. The harvest is excellent for all the crops, but there is no one here to go into it on a large scale.

Fifth. The only obstacles to overcome are labor and title to land; with these will come money and brains to use the land and labor.

Respectfully,

WM. A. PHILLIPS, *Governor.*

Prof. F. LAMSON-Scribner,
Chief Bureau of Agriculture, Manila, P. I.

PROVINCIAL GOVERNMENT OF RIZAL.

PASIG, July 18, 1903.

SIR: Replying to your official letter of the 10th instant, I have the honor to advise you as follows:

First. All of the land in this province is under cultivation; nevertheless some land could be bought, especially if a good price were paid for it. A balita of workable land ordinarily costs 100 pesos. Balita is the unit of measurement here, and represents some 2,000 square meters, or approximately 20 ares. The price per hectare is some 500 pesos, more or less.

Second. One to 1½ pesos is the daily wage of farm laborers, although it is not customary to pay them in money, the usual proceeding being that the laborer receives a share in the crop (or the products of the crop) from the owner or lessee of the land.

Third. There are two important crops in this province, rice and sugar. There are also corn, mangoes, sweet potatoes, bananas, and other tubers no less necessities of life for the planter. All of these could be increased advantageously if there were sufficient carabao in the province. An adequate supply of these animals is the only hope of salvation for the suffering planter and would enable him to look forward with confidence to the future for his subsistence.

Fourth. Thirteen thousand and thirty-seven hectares 68 square decameters and 97 square meters of land yielded last year 3,154,451 cavans of rice throughout the province; 1,682 hectares 43 square decameters and 33 square meters produced in the same year 57,752,005 canes of sugar; 409 hectares 9 square decameters and 75 square meters yielded for that period 615,585 ears of corn, besides other products, such as bamboo, tomatoes, bananas, melons, watermelons, small cucumbers, ilang-ilang, cocoanuts, betel leaves, plums, sweet potatoes, tobacco in the leaf, mangoes, tamarinds, oranges, zacate, pineapples, guavas, hicasas, rosemary, mulberries, abaca, peanuts, gages, chicos, mabola, eggplant, carambola, casuy (a gum), dates, onions, coffee, cacao, nanca, bonga, santol, lomboy, rubber, papaw, radishes, and others.

Fifth. The obstacles which it seems to me should be overcome are, first, the shortage in carabao; then the locusts, which destroy plantings; then the small worms, which resemble the phylloxera genus and destroy sowings of rice, sugar cane, corn, and others.

Respectfully,

A. DANCÉL, *Governor.*

Prof. F. LAMSON-Scribner,
Chief Bureau of Agriculture, Manila, P. I.

PROVINCIAL GOVERNMENT OF SAMAR.

CATBALOGAN, July 25, 1903.

SIR: Referring to your letter of the 10th instant, I have the honor to answer questions asked, as follows:

First. There seems to be no demand nor market for agricultural lands in this province at the present time.

Second. Ordinary farm laborers receive from 5 to 15 pesos per month.

Third. The principal money crop of the island is hemp. Others that could be mentioned are cocoanuts and their productions, such as copra; a limited amount of sugar, and an abundance of fruits, principally bananas, mangoes, etc.

Fourth. Can form no estimate of income derived from these crops.

Fifth. Obstacles to be overcome. The war has paralyzed all industries, and an agricultural bank, such as has been proposed, that would loan money on

real estate security and thus enable the people to again make a start would, I believe, prove of great help.

In addition to what has been stated in answer to No. 4, I would state that all of these crops can be materially increased, the production of the province being at a minimum and agriculture practically at a standstill.

Respectfully,

PEDRO A. CASANOVA, *Treasurer.*

Prof. F. LAMSON-SCHIBNER,
Chief Bureau of Agriculture, Manila, P. I.

PROVINCIAL GOVERNMENT OF SURIGAO.

SURIGAO, *July 23, 1903.*

SIR: In reply to your communication of the 10th instant, I beg to state the following:

First. There are private lands in this province that can be bought at the rate of 50 pesos per hectare.

Second. Ordinary laborers get half a peso per day.

Third. The principal crops which can be raised to a great advantage are manila hemp, copra, and rice.

Fourth. The following are at the present time the estimated yields, viz, 85,000 piculs manila hemp, 17,000 piculs copra, and 20,000 cavans of rice.

Fifth. In order to insure success in getting better results there should be undertaken the improvement of the present system of preparing and cultivating the land, and harvesting according to modern methods of culture or by means of improved agricultural implements.

Respectfully,

PRUDENCIO GARCIA, *Governor.*

Prof. F. LAMSON-SCHIBNER,
Chief Bureau of Agriculture, Manila, P. I.

PROVINCIAL GOVERNMENT OF TAYABAS.

LUCENA, *July 28, 1903.*

SIR: In reply to your favor of the 10th instant, I have the honor to state that, so far as I can learn, there are no private lands for sale on this coast, but that on the Pacific coast lands in limited quantities may be purchased at an average price of \$100 Mexican per hectare.

The average price for farm laborers on this coast is 50 cents Mexican per day and subsistence, or they are paid by the amount of work done. On the Pacific coast labor is obtainable only on the share system.

The principal money crops in the province are copra and hemp. As there is always a demand for these products, I see no reason why they could not be advantageously increased.

Estimated gross income from copra, \$1,050,000 Mexican per annum; no figures on hemp.

Increased facilities for transportation and an undiscovered incentive for labor would doubtless cause agricultural activity in the province.

Respectfully,

H. C. HUMPHREY, *Supervisor.*

Prof. F. LAMSON-SCHIBNER,
Chief Bureau of Agriculture, Manila, P. I.

PROVINCIAL GOVERNMENT OF ALBAY.

ALBAY, *August 19, 1903.*

SIR: I have delayed answering your circular letter of July 10, because I had not the information you desired, and have not until recently had an opportunity to get it. I think the following is reliable, as it was procured for me by the former supervisor of this province, who is now in business here, and is interested in this subject.

Private lands are for sale at the following prices: Rice land costs 50 to 80 pesos per hectare, well-planted hemp land near main roads 100 to 150 pesos per hectare, and hemp land not located near roads from 50 to 100 pesos per hectare.

Ordinary labor costs from 75 cents to 1 peso per day, except in Tabaco and Legaspi, the two ports, where it costs from \$1.50 to \$2 Mexican per day.

The principal crops are hemp, copra, ilang-ilang, and a little palay. Increase in hemp production depends on increase in amount of labor. There is more money in hemp than copra at this time, therefore the latter is being neglected for the former. Copra production could be greatly increased if labor was available. A great deal of rice is being raised this season, but under normal conditions very little is planted here, because the same amount of labor in hemp brings so much more revenue. About 200,000 bales of hemp (2 piculs to the bale) is the present hemp output of this province per annum, valued at about \$8,000,000 Mexican. The output of copra is worth about \$500,000 Mexican per annum and is steadily increasing.

The principal thing needed to increase the agricultural production of the province is more labor, more and better roads, and better facilities of communication. The roads are being rapidly and steadily improved, and when these are in good shape I hope to see new ones opened up. I think the general prosperity of the province depends more on good roads than any other one thing. Next to good roads labor is the most important requisite.

It will afford me pleasure to furnish you any information that I can with regard to the resources of this province.

Respectfully,

W. A. CROSSLAND, Jr., *Supervisor.*

Prof. F. LAMSON-SCRIBNER,

Chief Bureau of Agriculture, Manila, P. I.

PROVINCIAL GOVERNMENT OF BULACAN.

MALOLOS, *September 1, 1903.*

SIR: I have the honor to acknowledge receipt of your circular letter of July 10 and to reply as follows:

First. Yes; and the price varies, according to the class of soil, from \$25 to \$500 Mexican per hectare.

Second. Plowmen are paid 1 peso, and sowers 25 cents Mexican per day.

Third. Rice, sugar, corn, sweet potatoes, gabi, and tobacco. The production of these crops could be increased by the use of modern farm implements and irrigation.

Fourth. It is impossible to estimate the value of the crops raised owing to the scarcity of rain in this latitude, this fact having caused much despair among the planters.

Fifth. The lack of working animals and scarcity of rain (as already stated) are the chief obstacles to be overcome in order to obtain larger crops and excite agricultural activity in this province.

It is recommended that there be installed pumping engines, artesian wells, or ditches to furnish sufficient irrigation for the land, that uniform agricultural activity may be maintained and abundant crops assured.

Respectfully,

PABLO TECSON, *Governor.*

Prof. F. LAMSON-SCRIBNER,

Chief Bureau of Agriculture, Manila, P. I.

PROVINCIAL GOVERNMENT OF CAGAYAN.

TUGUEGARAO, *August 10, 1903.*

SIR: In answer to your letter of July 10 would state:

First. There are private lands that can be bought in this province ranging from \$10 to \$250 Mexican per hectare. It is a hard matter to buy land, but it can be done with a little patience.

Second. Laborers are paid 40 cents to 80 cents Mexican per day.

Third. Tobacco, corn, rice, nilpa; these are the principal crops in the order named. Coffee and cacao grow well, but not much has been done with them; there are great possibilities here in these two lines. About all the land suitable is now held by the government. Tea and Peruvian bark could be grown here; the latter is now grown in the province, but its value is not understood. Agriculture, with the exception of tobacco, is nearly at a standstill in this province.

Fourth. I am unable to give an estimate of the income derived from crops.

Fifth. The great trouble is to get the natives to work; they do not understand the production of anything but tobacco and corn. Very poor corn is produced; new seed is needed in all lines, the best always being used for con-

sumption and the poorest for seed. Potatoes and other vegetables would do well here. The fact that good profits can be made from the lines now neglected must be proved by example before the people will take hold. Labor is the great stumbling block.

Respectfully,

WM. E. PEARSON, *Supervisor.*

Prof. F. LAMSON-SCRIBNER,
Chief Bureau of Agriculture, Manila, P. I.

The following in regard to labor contracts, translated from the Boletín Oficial Agrícola de Filipinas of July 31, 1896, is of interest in this connection:

PRINCIPAL CLAUSES IN CONTRACTS OF LEASE AND PARTNERSHIP COMMONLY EMPLOYED IN THE PROVINCE OF NEGROS OCCIDENTAL.

In this island the farmer is not always a landowner; he is sometimes a lessee, and often a partner. Contracts of partnership and lease are as diversified as the different cases to which they are applied.

Sometimes estates provided with buildings, machinery, agricultural implements and stock sufficient to conduct the work properly are let for one-third of the gross product; that is, the owner delivers the estate in working condition and the lessee contributes the necessary annual capital and intelligence. The gross product is divided into three equal parts, one of which goes to the proprietor and two to the lessee. Contracts of this kind were justified in past years by the price of sugar, which was sufficiently high to enable the lessee to cover expense of cultivation and obtain an appreciable return. Whenever the price of sugar suffered any considerable reduction the contract clauses were so modified as to allot to the proprietor no more than a fourth or a fifth of the gross product.

This class of contract presents one difficulty, which is that there is no guaranty to the proprietor of natural fertility of the land; for, in the absence of special clauses to fix the number of hectares which should be cultivated, the fertilizers to be applied or the cultivation to be given to the soil, the lessee must use his own discretion in these matters. As a consequence, he is likely to impoverish the soil in a few years. Some estates are leased at a fixed and determined cash price, the average rental being based upon 10 per cent of the value of the estate when supplied with all the material necessary for its exploitation.

There is a wide divergence in partnership contracts in this island. In some the partner tenants contribute nothing but brains and labor. The owner supplies a certain number of carabao and points out a piece of land for them to cultivate for his account; he is also under obligation to advance the funds with which to pay the day labor absolutely necessary for cultivating the land. In harvest time these amounts are reimbursed to him, plus a certain rate of interest, which is never less than 10 per cent. The partner is charged with all expenses incident to preparation of soil, planting, cultivation, cutting the cane, and cartage to mill. Each of the contracting parties bears the expense of packing his own share of the sugar. The gross product is divided, share and share alike, between the proprietor and the lessee.

There are other contracts, according to which the partner contributes stock sufficient to work the tract of land taken in partnership; but, lacking the necessary capital, this is advanced by the proprietor, who does not usually collect interest for money so advanced. In other cases the partner puts in stock and capital sufficient for the cultivation of the land taken in partnership. He bears the expense of cutting and carting the cane, while the proprietor pays milling expenses. The gross product is divided equally between the proprietor and the partner. A sum of 6 pesos per hectare of calauan (aftermath) is generally collected as compensation for care given same, provided this crop is not the result of sowings.

Various other contracts exist which differ in form from those previously explained, though essentially they are identical. The clauses in these contracts vary according to the education and intelligence of the contracting parties.

For rice there are forms of contracts contingent upon whether or not the partner has cattle for tilling the soil. If not, the proprietor furnishes the lessee with the number of carabao required for seeding and also some funds. All the expense of cultivation is borne by the partner. When the gross product has been gathered the proprietor is reimbursed for the seed which he furnished,

and the remainder is divided equally between the proprietor and the partner, the latter being bound to return to the former any advances made. Interest is not generally collected unless previously stipulated.

If the partner owns cattle with which to cultivate the fields, the gross product, instead of being divided equally, is divided into thirds, after the seed has been deducted. The proprietor receives one-third and the partner two-thirds.

Contracts of partnership in tobacco are very analogous to these. The proprietor always furnishes cattle for working the land and also the seed. The partner assumes the care as well as all expenses of cultivation. The gross product is divided equally between the contracting parties. The proprietor is reimbursed from the partner's share for the funds advanced by him, the product being valued at the market price. He collects interest, which is not usually less than 6 per cent.

Abaca is generally cultivated on a partnership basis. The following is the form of contract made: It is agreed that after setting out the plantation (the expense of which is borne by the proprietor), the partner cares for the same. He elaborates the product, which is divided equally between the parties, the proprietor being reimbursed for funds advanced in the manner already explained.

When cocoanuts are raised for the purpose of producing the alcoholic beverage called tuba a partnership is formed. The contract is made when the tree begins to yield a return. The owner delivers the grove to the partner, who, in his turn, assumes the work of collecting and selling the sweetened liquid. The amount realized from the sale of the product is divided equally between the parties.

FARM WORK LET BY CONTRACT.

Much of the farm work is let by contract—that is, the payment of a certain sum is guaranteed for a certain amount of work done. The native laborer prefers this method—not from a desire to obtain greater benefit, but in order that he may neither be compelled to work a certain number of hours per day nor six days every week, but may work when it best suits him.

The breaking of uncultivated land, the preparation of cane fields, planting of cane, and other labor required during its growth, such as weeding, covering with earth, etc., are generally let out by contract.

The cutting and carting of cane to the mill are also let by contract, the price of same being fixed per picul of sugar obtained and not per unit of area, for the reason that a certain area may, in two different fields, yield different quantities of cane, according to the distance between plants and the number of shoots sprouted by each.

Carting the sugar to the wharves is also generally let by contract, at an average rate of 1 real (12½ cents Mexican) per picul. On some estates the grinding is also done by contract, the cost depending upon the quality and quantity of sugar.

The rice harvest is regulated by an amount which equals the third or fourth part of that gathered by the reapers, this amount varying according to the economic conditions of the year.

Wages in this island are scarcely ever paid in coin. As a rule the laborer receives for his work a certain amount in coin and the balance in kind—that is, either his food already cooked, or only the amount of palay or rice necessary for his maintenance, besides a small quantity of fish known by the name of Balligon, which he uses as seasoning for his morisque (boiled rice), his principal source of nourishment. However, in whatever form he may receive his wages, the rate always varies according to the period of the agricultural year when the field work must be done. It may, therefore, be stated that two distinct prices exist, each of which governs during six months of the year.

In dull times—that is, when there is no cane to grind—75 cents per week, with board, is generally paid. Cane is the crop chiefly cultivated in this island and therefore the one which determines the rise and fall in the rate of wages, owing to the large number of laborers required. At harvest time, especially in years when labor is scarce and every day adds to the planter's troubles, \$1.25 with board is usually paid to induce people to come from Cadiz and Antique, raising the average daily wages of a laborer to 20, 30, and even 40 cents.

It is impossible to fix exactly the approximate amount of advances allowed to lessees, contractors, and day laborers, as when the demand for labor is great the farmer is compelled to advance the amount required in order that the work

may suffer no interruption. Besides, during a fortnight of work many of the laborers draw almost all of their income for the next two weeks. Notwithstanding that this is of frequent occurrence, we may say (although the figure is not very accurate) that 15 per cent of the value of the work is approximately the amount it is customary to advance to lessees. Interest upon sums thus advanced is not usually collected, though we know of some exceedingly rare instances where work is conducted upon a small scale in which a charge is made for all money advanced.

The risk incurred in advancing money for labor still to be performed, or to contractors for hiring the people needed for the work of grinding, or in meeting the continual demands of the laborers, is very great, because these laborers rarely perform the work in the time and manner agreed upon, and the contractors either do not furnish the necessary people or, if they do, half of them disappear in a short time, and, finally, the laborers are continually changing masters without repaying the funds advanced to them.

From the foregoing statements we conclude that the average risk incurred in advances—in other words, the amounts advanced for work to be performed—does not fall below 60 per cent.

F. MORENO Y SUIT, *Acting Engineer Director.*

PROVINCIAL GOVERNMENT OF CAVITE.

CAVITE, *September 3, 1903.*

SIR: In answer to your letters of July 10 and August 28, respectively, I have the honor to submit the following replies herewith:

First. It has been impossible for me to secure full and positive information regarding private lands that are for sale or that may be bought. Since nearly half of the area of this province is under private ownership, salable land is probably not lacking. * * *

Second. Daily wages fluctuate between \$0.50, \$1, and \$1.50 Mexican, according to whether or not the laborers receive board and lodging, and according to the ability of the laborer and whether he furnishes implements and working animals. In the latter event he usually receives a proportionate increase for care and food for his stock. This, however, is not the method most generally pursued, the usual proceeding being to form a partnership, by the terms of which one-fourth or one-fifth of the crop is apportioned to the "aparceros" or "casamas," as these farm laborers or copartners are usually called.

Third, fourth, and fifth. The entire crop of rice in the province was and will be insufficient to supply the needs of the pueblos, and the article has been imported for some time; for this reason such laborers as receive \$1 per day prefer to take their wages in rice. With the complete extermination of locusts and the importation of working cattle sufficient to perform farm labors the agricultural wealth of this province would soon increase considerably.

Please pardon delay in replying, as it has taken some time to secure the information, which, as you may observe, is not as complete as I should desire.

Respectfully,

D. C. SHANKS, *Governor.*

Prof. F. LAMSON-SCHRIENER,

Chief Bureau of Agriculture, Manila, P. I.

PROVINCIAL GOVERNMENT OF NUEVA VIZCAYA.

BAYOMBONG, *August 20, 1903.*

SIR: Replying to your letter of July 10, I have the honor to state that, under date of May 29, I wrote a report on the agricultural outlook, conditions, and possibilities of this province which covered most of the questions asked in your letter, and which letter was forwarded to the honorable civil governor, suggesting that it might be of interest to your department.

There are private lands which can be obtained by purchase, but there is probably not a single valid and completed title of ownership to a piece of land in the province, and out of some 70,000 hectares of land in the possession and use of natives of this province only about 1,200 hectares are registered by anyone under the former Spanish laws regarding registration of land and real property, and most of that has not gone beyond the first stage of simply registering what was claimed by the parties without submitting any proofs of ownership or proceeding to the point of a completed title for same. Titles consist

of possessory rights and the boundaries are undefined in any way. Farms consist of little plots of ground in all sorts of shape and rarely exceeding more than 5 or 6 acres in a farm. There is any amount of unoccupied land on all sides, and the natives do not place much value upon the land and frequently abandon same and take up a new piece of unoccupied land, for reasons best known to themselves.

Good choice pieces of rice and garden land, including the water rights for irrigation of same, can be bought for about 15 pesos per acre if the purchaser is willing to accept such a title as the seller is willing and able to give, which is nothing more than a receipt for the money and possession of the property.

Wages usually paid farm laborers are as follows: From 30 to 40 cents local currency per day and rice worth about 10 cents more, and the laborer takes good care to only do 30 or 40 cents' worth of work, and the labor is difficult to get and not to be depended on at all.

The principal money crop in this province is rice, and there are still thousands of acres of rice land unused.

The income derived from the sale of the surplus rice from this province will not exceed 100,000 pesos per year, as the population is 45,000 wild Igorots and only 16,000 Christians, and the people produce only enough to provide food to sustain life and enough over to sell to buy clothes and pay taxes, but as the great majority are Igorots, who neither wear clothes nor pay taxes, they do not have to worry about any money at all.

The principal obstacles which have to be overcome in order to secure larger crops and greater agricultural activities in this province are, first, means of transportation and communication, which can best be brought about by the building of a railroad through the heart of the island of Luzon from Manila to Aparri. There is no present means to get any products in or out of the province, and to transport farm products to the railway or to some seaport costs from 10 to 15 cents (Mexican) per pound, and you must be aware that there are few farm products which will stand such a cost for transportation as that just named.

The second necessity, provided we had the railroad, would be the introduction into this province of more energetic people, who have higher ambitions than simply existing, because the present natives of this province have no desire to accumulate wealth or acquire property provided that their doing so will necessitate hard labor and industry on their part. They seem to be absolutely happy when they have enough to eat and money enough to buy a few clothes, and having that provided for, they quit work for the rest of the year and refuse to perform any labor beyond daily household duties of cutting a little firewood, carrying a little water, and beating out the rice for the day's use.

This is not very encouraging, but it is none the less true, and we will never learn anything by deceiving ourselves, so I write you the truth as I find it.

Respectfully,

L. E. BENNETT, Governor.

Prof. F. LAMSON-SCRIBNER,

Chief Bureau of Agriculture, Manila, P. I.

PROVINCE OF CAPIZ.

CAPIZ, September 9, 1903.

SIR: Replying to your circular letter dated August 28, 1903, I have the honor to state the following:

First. There are private lands which can be purchased, and which owners would like to sell, in view of the present condition. Prices per hectare are in accordance with kind of land—from 100 pesos for best sugar land to nothing. Considerable has been advertised to be sold for taxes, but no bids received.

Second. Thirty cents Mexican per day.

Third. Rice, buli, tuba of nipa plant, hemp, copra, corn, sweet potatoes, and sugar; and these could be very much increased with modern methods.

Fourth. It is impossible to estimate the amount of income at present time, as no answers were given from the municipalities.

Fifth. The principal obstacles which must be overcome are the ancient system of cultivating and great lack of farm animals. There is great need of modern farm machines for planting, caring for, and harvesting crops, and it is believed that if such implements could be sent to a few of the towns in the province and a practical demonstration of their use be made that as far as

they are able the people would adopt them. The people are very poor and the province has suffered greatly from locusts and drought. Efforts are now being made to destroy the locust and so far have seemed to meet with success, but there are enough here to cause anxiety. It is believed that enough attention is not given to the cultivation of sugar in this province. The haciendas destroyed during the war have not been rebuilt, and the large amount of capital needed to put them up anew is not in the province. As a consequence large areas of good sugar land is now unproductive. This would make a good investment for American capital.

The resources of the province are very great, and it is expected that the present state of agricultural stagnation is temporary only. This was at one time one of the principal rice-producing provinces in the islands, but since the war enough has not been raised for its own consumption. It would be an excellent thing to bring in a few enterprising American rice farmers, with proper tools for the work, to get the rice growing started again.

Very respectfully,

F. S. CHAPMAN, *Provincial Supervisor.*

Prof. F. LAMSON-SCRIBNER,
Chief of Bureau of Agriculture, Manila.

PROVINCE OF AMBOS CAMARINES.

NUEVA CACERES, *September 4, 1903.*

SIR: In reply to your circular letter of August 28, I have made inquiries and find the following:

First. There is considerable private land in this province that can be purchased. Nothing general can be stated as to price, as it varies greatly in the same locality according to the caprice of the owner. Land has been bought here recently for \$1 per acre.

Second. Farm laborers are paid 50 cents Mexican per day. Most of the labor is done on shares. A very industrious laborer in the hemp district can earn \$4 Mexican per day.

Third. Hemp, cacao, and rice. The rice crop has been a failure here for the past two or three years, owing to drought, pests, and scarcity of carabao.

Fourth. No data available.

Fifth. The main obstacles to be overcome are the following: Scarcity of carabao, drought, overcome by developing irrigation, and the people shown that much depends upon their own efforts.

Very respectfully,

EDW. S. SHUMAN, *Provincial Supervisor.*

Prof. F. LAMSON-SCRIBNER,
Chief of Bureau of Agriculture, Manila.

PROVINCE OF LEPANTO-BONTOC.

CERVANTES, *August 1, 1903.*

SIR: In answer to your letter of July 10, I have the honor to submit the following for your information:

First. Private lands in the province may be purchased for about 170 pesos per hectare.

Second. Ordinary Igorot farm laborers receive from 12 to 20 cents Mexican per day. An American could not obtain labor for less than 20 cents.

Third. The principal money crops are coffee, cacao, rice, and a little tobacco. All these crops, with the possible exception of rice, could be increased.

Fourth. Coffee will net about 80 to 100 pesos per hectare, rice 30 to 40 pesos per hectare. Of cacao and tobacco I can give you no information.

Fifth. The difficulty of obtaining a requisite number of laborers is the chief obstacle to an increased agricultural activity. The chief difficulty in the marketing of products lies in the cost and difficulty of obtaining transportation to the coast.

Very respectfully,

M. GOODMAN, *Provincial Supervisor.*

Prof. F. LAMSON-SCRIBNER,
Chief of Bureau of Agriculture, Manila.

PROVINCE OF CEBU.

CEBU, September 7, 1903.

SIR: In reply to your letter of August 28, referring to letter of July 10, I have the honor to state that on July 28 I answered your letter and stated that in order to give accurate information I would send out inquiries from my office. Inclosed you will find a copy of the circular sent out; as yet no answers have been received.

Below are given the only answers obtainable at present.

First. Yes; prices vary according to location; average, \$100 Mexican.

Second. Twenty-five to 40 cents per day of about five hours (counting rests). In working American hours, 50 to 60 cents Mexican.

Third. Corn, tobacco, sugar, rice, and copra, in the order named. Could all be vastly increased in both quantity and quality by use of modern methods and energy.

Fourth. Can not tell at present. Know of one 12-acre lot that produced \$1,200 Mexican planted to corn.

Fifth. Drought, locust pest, lack of draft animals, steady labor (natives take a rest of several days to spend savings; liable to do this in harvesting season), and a better knowledge of agricultural methods.

In addition I would like to say that a great deal could be accomplished by an experimental farm in making the 1,800 square miles and 650,000 inhabitants of Cebu more productive. There are great areas of mountain slopes which would grow grapes, but which at present only grow poor crops of corn.

Very respectfully,

H. DE LANO, *Supervisor.*

Prof. F. LAMSON-SCHIBNER,
Chief of Bureau of Agriculture, Manila.

PROVINCE OF ILOCOS NORTE.

LAOAG, September 20, 1903.

SIR: In reply to your circular letter of July 10, and a second of August 28, I have the honor to state that the questions asked were referred to Mr. Lallave, who is probably known to you as the best-informed man here on agricultural matters, and he informed me that he was then preparing a monograph for your information which would cover the points. He has been recently devoting himself to the extermination of the langosta and has been but seldom in Laoag for some time, and it is probably for this reason that you have not heard from him. I am able to supply you with but general information, but such as it is I am glad to put at your service.

First. I know of several large bodies of agricultural lands now on the market for sale and which could be bought for probably one-half their assessed value, which is \$60 United States currency per hectare.

Second. I am securing all the labor I want on public works at 30 cents Mexican per day, and I know of no reason why landowners can not do the same. Offering a monthly wage they could probably do better.

Third. The only reliable crops at present, in view of the devastation being wrought by the langosta, are maguey and tobacco. The area for the cultivation of the latter is limited, but at the present time by no means exhausted. The former is being planted in large quantities. On my last trip north it was reported to me that 250,000 ratones or shoots had been set out during the last year, and that more would be planted this year. There are large areas in the northern part of the province well adapted to the cultivation of this plant which are still uncleared and could be bought cheap.

From the best general information which I can at present gain, I would estimate the exportation of tobacco last year at 13,000 quintals, and that of maguey at 9,000 picos.

It has been proven that there are good coffee, cacao, and indigo lands in the province, and their cultivation should be encouraged.

Fourth. Tobacco slightly less than Cagayan and Isabela prices.

Most of the maguey is taken to Ilocos Sur, as a better price by 20 per cent can be obtained there than here, on account of its being an older market.

Little attention has been given to coffee, cacao, and indigo since the revolution, and scarcely no crop is being gathered.

Very respectfully,

PAUL F. GREEN,
Provincial Supervisor.

Prof. F. LAMSON-Scribner,
Chief of Bureau of Agriculture, Manila.

PROVINCE OF ILOCOS SUR.

VIGAN, September 8, 1903.

SIR: In reply to your letter of August 28, I have the honor to state the following:

First. There are in this province private lands that can be obtained by purchase at a rate varying from \$50 to \$200 United States currency per hectare. On account of the small quantity of land and the large number of people, the price of land is very high, but at the prices named there can be purchased a considerable quantity.

Second. The wages usually paid farm hands range from 20 to 40 cents Mexican per day.

Third. The principal money crops in this province are maguey and sugar. They could be advantageously increased by irrigation and the use of modern methods of farming.

Fourth. It would be impossible to give even a poor estimate of the amount of income derived from these crops. They are raised in small lots and by many people, then bought up by the larger dealers, and thus no possible estimate could be obtained.

Fifth. There are many obstacles to overcome to secure better crops. The principal one is the inherent laziness of the people. As a rule they care little for money, and so long as they get along they are satisfied. Then the methods of work which they have need to be changed, new tools introduced, and a general overcoming of the primitive ways which they have been taught and still cling to. The land here is very rich, and it seems to me that if some one who knew how would go to work and help the people to new methods that a fine showing could be made here.

Very respectfully,

J. C. HAWLEY,
Provincial Supervisor.

Prof. F. LAMSON-Scribner,
Chief of Bureau of Agriculture, Manila.

PROVINCE OF OCCIDENTAL NEGROS.

BACOLOD, September, 1903.

SIR: In answer to your circular letter of August 28, 1903, I wish to state that:

First. There are many haciendas in Occidental Negros for sale and at prices less than their assessed value. In the northern part of the province I have been reliably informed that land can be bought for from \$5 Mexican per hectare up. This land is rolling and about 4 or 5 miles from the sea, has been cleared, but worked very little, and is very fertile and well suited to the cultivation of hemp, cacao, tobacco, and cane. Sugar lands can be bought from \$30 hectare up, according to how hard pressed the owner may be.

Second. Men planting palay get 1 real (12½ cents) per day and food. Men working in cane fields get more, sometimes getting as high as \$1.50 per week with food. It should be remembered that a great deal of the farm work here is done by "paquiao" or small contracts—such as planting or transplanting cane, rice, etc.—where the laborers get so much per 1,000 shoots set out.

Third. Indigo was formerly the big crop in Negros, in the sixties and seventies, but died down before the increase in sugar production; now several hacendados are planting again. Sugar was and is the principal crop here, and cultivated properly will yield good results, though the lack of roads makes the best and freshest lands almost inaccessible. I was informed by Mr. Stevens, a planter from Hawaii, who visited this province last year, that the hacendados here lost on their sugar in the following manner: First, they raise a poor grade of cane; second, they only get 45 per cent of the juice; third, the sugar made is of a poor grade, and fourth, transportation from fields to mill is costly

and equally so from mill to coast. Hemp is a good paying crop and is being sown in larger quantities than before. It has the advantage of being very healthy and resistant to grasshoppers; also does not need much care; is generally raised on shares. The demand seems to exceed the supply, as at present a picul of abacá is worth about \$27 Mexican. Rice: The best rice lands produce 80 or 90 cavans of palay to the hectare, and it is a very safe crop if locusts don't eat it up. At present prices of rice no crop would pay better. Other crops that bring in money are tobacco, cacao, bonga, and cocoanuts, though none of these are cultivated on a large scale. Tobacco is the money crop of Escalante.

Fourth. Any estimate made would be very wide of the mark, but I think the limit would be not over 1,000,000 piculs of sugar per annum; 100,000 cavans of rice; 2,500 piculs abacá; 2,500 piculs tobacco (this is a pure guess), and 2,000 piculs copra.

Fifth. The great evil here is the lack of money and the system of doing business on credit, by means of which the hacenderos always keep in debt and pay such rates of interest that they will never get out. For instance, they borrow money at 12 per cent (sometimes 30 per cent), bind themselves to buy all their supplies from the house in Iloilo which advances the money, also promise to freight their crops in the company's boats, store in the company's warehouses, and sell through the company, so that by the time the account is closed they find that they have paid about 50 per cent on their loan or more—generally more. With the hacenderos always in debt, I don't look forward to any great improvements in agriculture until people with money come to take a hand in developing the country. My own idea is that agricultural companies and agricultural banks, such as exist in Java and Sumatra, would do a great deal toward opening up the country.

It stands to reason that a man heavily in debt and with bankruptcy staring him in the face does not feel like improving his farm when he may be sold out to-morrow.

Very respectfully,

J. D. FAUNTLEBOY, *Provincial Supervisor.*

Prof. F. LAMSON-SCRIBNER,

Chief of Bureau of Agriculture, Manila.

PROVINCE OF OCCIDENTAL NEGROS.

BACOLOD, *September, 1903.*

SIR: Replying to your interrogatory to this office of July 10, 1903, I have the honor to advise you as follows:

First. There is always salable land in western Negros, the price of which varies from 25 to 150 pesos per hectare. At present agriculture is in such a state of decadence, owing to lack of capital, death among cattle, cholera, paludism, drought, locusts, rats, frogs, etc., that two-thirds of the private lands are lying uncultivated, and there is now more land for sale than ever before. I may say, practically, that proprietors are willing to sell their land at the assessed valuation.

Second. Laborers receive at the present time 1 peso per week and meals. As regards meals, the frugality of our laborers is proverbial; they are content with a little rice and vegetables or fish, which food they prefer to meat. The cost of meals averages 18 centimos per day per laborer. On the haciendas, besides the field laborers, there are others, employed in the sheds during the grinding season, who receive 1½ pesos per week and meals. The provincial government is to-day paying road laborers 40 centimos daily, without meals.

Third. The crops in the province are sugar, rice, corn, tobacco, abacá, bananas, buyo, bonga, coffee, cacao, copra, tuba, other fruits, bamboo, nutritious tubers, etc., the most important being sugar (our characteristic crop), tobacco, abacá, and corpa, which are exported; the balance are for interior consumption, although at times portions of the same are carried to neighboring islands. It is evident that the agriculture of this province may be greatly increased. With capital, machinery, and improved methods there is not a doubt that agriculture in western Negros, with its soils of exuberant fertility, watered by numerous rivers (constituting a veritable treasure of motive power and which are inexhaustible fountains for irrigation), would take an extensive upward sweep, hitherto undreamed of; for it would be but natural that man's efforts should prove very much more efficacious in this paradise of fertility, where reigns eternal spring,

than in other countries, in which the planter can only succeed in wresting from the soil the fruit of his sweat by the aid of art and science.

Fourth. It is difficult to calculate the total amount yielded by agriculture in the province at present. In normal times the crop of sugar (with our defective methods of elaboration—to say nothing of defective cultivation—in which according to those well versed on the subject, 45 per cent of saccharin is lost), is about 1,000,000 piculs annually for the entire province. That of rice is estimated at 500,000 cavans; of corn at 25,000 cavans; of tobacco at 8,000 quintals; and of abacá at 1,500 to 2,000 piculs. In the past year the corn crop was larger, and further good increases are also expected in the future in tobacco and abacá, especially the latter, of which planters having resources at their command (taking into account the fact that this plant has suffered very little—in fact, almost nothing—from the consequences of public calamities from which this province and all of the Philippine Islands are suffering, and in view of the good prices paid for abacá, due undoubtedly to its free entry into the United States) have made sowings in such of their land as is suitable to this cultivation.

Fifth. The obstacles at present standing in the way of agricultural progress may be summed up in the scarcity of capital brought about (as is inevitably the case) by a system of tyranny, almost exorbitant, with regard to the calamities and misfortunes from which the planters suffer. Loaning funds at 25 per cent annually is considered a favor, as the usual charge is 40 per cent, and even more in some cases. Banking and commercial houses, in this locality and in Iloilo, loan money on mortgage upon real property ostensibly at 15 per cent, but practically the interest amounts to 40 per cent on account of the conditions imposed by the contract, which are exceedingly onerous to the debtors; such, for instance, as selling the sugar to the creditor or through him; transporting the products via the ships of the creditor; procuring machinery, materials, and other necessities from the creditor, etc. The depreciation of Mexican money and the reduction in the price of sugar, together with the calamities mentioned at the beginning, may give some idea of the condition to which agriculture and planters in this province have been brought—a condition only remediable by the establishment of agricultural banks which will loan money at reasonable rates of interest. This is the radical remedy for the parent cause of all our present ills. From this spring naturally the problems of means of transportation, scarcity of cattle occasioned by the death of 90 per cent of our stock, perfecting of machinery, and improvement of methods. Then, there is indisputable need of a railway in this province, with a branch passing through the towns of eastern Negros, on the other side of the mountain range; such improvement established, great gains would accrue to the enterprise, considering the present high cost of land transportation, which averages from 10 to 25 centimos per picul over a distance of 8 kilometers. As regards methods and implements of cultivation, these may also be much improved by a study of the land, by planting in each field the products most suitable to its particular soil, and by the employment of cutting implements for palay, of portable machines for turning and plowing the ground which would offset the present scarcity of working cattle, and of laborers during harvest time (which season coincides exactly with that for plowing and planting sugar cane). Now, as regards portable machines, it should be borne in mind that property in this province is very much cut up, and that a portable machine would not have the beneficial results that would accrue if employed for but a single hacienda. However, with good means of communication between haciendas, there is no doubt that the employment of such machines would meet with the highest success, and that the planters would unite in using them. As to the elaboration of agricultural products, we can only speak of sugar, this being at present the most extensively grown crop in this region. As I have already stated, the elaboration of sugar in this province suffers a loss of some 45 per cent of saccharin, according to the opinion of experts, while it is said that in Hawaii the loss of such matter is reduced to some 5 per cent, due to the greater degree of perfection of the machinery and boiling apparatus in use there. Our agriculture and our industries may be said to be still in their infancy, and it is only natural to suppose that they would be susceptible to great progress, considering the inexhaustible resources of our soil.

Very respectfully,

L. LOCSIN RAMA, *Provincial Governor.*

Prof. F. LAMSON-Scribner,

Chief of Bureau of Agriculture, Manila.

PROVINCE OF ORIENTAL NEGROS.

DUMAGUETE, September 14, 1903.

SIR: I have the honor to acknowledge receipt of your kind letter dated July 10 of the present year, which for reasons not of my willing I have been unable to answer in proper time, for which I request that you excuse me.

In accordance with the questions of your letter I beg to inform you of the following:

First. On account of the precarious condition of the agriculture in this province private lands could easily be gotten under the following average prices: Superior class land, from \$60 to \$100 Mexican per hectare; inferior class land, from \$20 to \$50 per hectare. These are the prices that prevail generally in the majority of the towns of the province, excepting only the lands of the town of Bais, devoted to the cultivation of the sugar cane, which on account of their special kind are appraised in the average at \$200 per hectare.

Second. The average wages for an ordinary farm laborer is 12 cents Mexican a day, with two meals, that generally consist of cooked rice with a little salted fish or dried fish, with fresh vegetables sometimes.

Third. The hemp, from \$18 to \$20 Mexican per picul of 137½ pounds, according to the quality. Sugar, from \$4 to \$5 per picul, according to class. Corn, \$5 a cavan. I do not have the least doubt that these crops can advantageously be increased.

Fourth. Average income derived from main crops: Hemp, 50 per cent; copra, 25 per cent; sugar, 5 per cent; corn, 40 per cent.

Fifth. Three are the main obstacles to overcome in order to secure greater agricultural activities in this province. First, the lack of capital to protect the farmer, and that only a reasonable interest be imposed; second, the original implements that are heretofore being employed for the field labor, as also the old machinery for the grinding of the crops; third, the natural indolence of our farm laborers.

Very respectfully,

D. McLAREN, *Provincial Governor.*

Prof. F. LAMSON-SCHIBNER,

Chief of Bureau of Agriculture, Manila.

PROVINCE OF SORSOGON.

SORSOGON, September 22, 1903.

SIR: I have the honor to make the following report on agricultural conditions in this province, in reply to your communication of August 28:

First. Fully one-half of the land of the province may be considered as being on the market. The prevailing prices are, for first-class hemp land, from \$50 to \$60 Philippine currency per hectare. Second-class hemp land, from \$20 to \$30 per hectare. Rice and uncultivated lands, from \$5 to \$30 per hectare.

Second. It is customary to allow the laborers in the field one-half of the crop they market. In exceptional cases where laborers receive day wages the average wage is \$1 Philippine currency per day.

Third. The principal crop at present is hemp. In order to increase the crop additional labor is required.

Fourth. It is estimated that two-thirds of the land in the province is planted in hemp. First-class hemp yields an average of 6 piculs per hectare, annually, which sells on the local market at \$20 Philippine currency per picul. Allowing one-half to the laborer, the owner nets \$30 Philippine currency. Second-class hemp land nets about 20 per cent less.

Fifth. The first obstacle to overcome is additional laborers and draft animals. Then good roads are required to open up a market.

Very respectfully,

E. WESTERHOUSE, *Provincial Supervisor.*

Prof. F. LAMSON-SCHIBNER,

Chief of Bureau of Agriculture, Manila.

PROVINCE OF TABLAC.

TABLAC, September 11, 1903.

SIR: Referring to your favor of the 28th ultimo, concerning land, wages, and agricultural products, I have the honor to reply to your questions, but I have such little information myself that my answers are very unsatisfactory:

First. There are private lands in this province, and the only sale that I know of was for about \$100 United States currency per kison. There seems to be no recognized price for land, and the price, so far as I can ascertain, depends on how necessary it is for one man to sell and how much the other wants the land.

Second. Ordinary farm laborers, I am told, receive from 20 cents to 40 cents Mexican per day. I have to pay 50 cents per day for common laborers on road work.

Third. The principal crop of this province is rice and the second in importance is sugar. They could both be greatly increased.

Fourth. I can get no reliable information as to the amount of income from these crops. Upon inquiry I got such different answers that I concluded they were wild guesses.

Fifth. More work animals and better methods of farming are necessary to larger crops and greater agricultural activities. It is my opinion that no more than one-twentieth of the land in this province suitable for successful agriculture is being cultivated.

Respectfully,

S. C. PHIPPS, *Provincial Supervisor.*

Prof. F. LAMSON-SCHIBNER,

Chief of Bureau of Agriculture, Manila.

PROVINCE OF ZAMBALES.

IBA, September 13, 1903.

SIR: Replying to your favor of the 29th of August, 1903, I beg to state:

First. That there are in this province private lands which may be bought at the price of \$80 per hectare.

Second. That the wages ordinarily paid to laborers amount to 1 peso per day.

Third. The principal crop of this province at present is rice; sugar cane is also cultivated, but upon a small scale, and the yield is only used for local consumption. I believe that these crops could be improved.

Fourth. The present crop of rice may be estimated at approximately 270,000 cavans and that of sugar cane at 10,000 piculs.

Fifth. To secure a better harvest of the products mentioned in No. 3, it is necessary, in my opinion, to overcome two chief obstacles, which are lack of carabao and frequent drought. In order to overcome these obstacles, planters should be supplied with capital to enable them to buy carabao and construct irrigation canals. Such capital could be furnished them if an agricultural bank were established in this province.

There are 27,375 hectares of land under cultivation and there are 31,870 hectares of public lands which could be cultivated.

Respectfully,

POTENCIANO LESACA, *Governor.*

Prof. F. LAMSON-SCHIBNER,

Chief of Bureau of Agriculture, Manila.

PART I.

CHAPTER VII.

AGRICULTURE.

[Revised by Dr. Frank Lamson-Scribner.]

Varieties of soil—Varieties of plant life—Rainfall—Rice a staple crop—Varieties of rice—Work of bureau of agriculture—Rice cultivation pursued with care—Methods employed by natives—Work done by hand—Ravages of locusts—Modern machinery—Corn—Sugar industry—Crude methods which obtain—Varieties of cane planted—Soil requisites—Primer on the cultivation of cane—Lands adapted to the growing of cane—Land titles—Sorghum—Tobacco—Spanish monopoly—Manufactures of tobacco—Tobacco lands—Coffee plantations destroyed—Soil suited to coffee growing—The cacao—Philippine cacao unsurpassed—Varieties of cacao—Gum chicle—Stock raising—Grazing lands—Water supply—Forage grass (zacate)—Cogon—Native horses—Ilang-ilang—Cocoanut—Sesamum—Lumbang—Jatropha—Curcas—Peanut—Nutmegs—Cinnamon—Indigo—Other dyes—Leguminous plants—Starch-producing plants—Fiber plants—Rattan—Bamboo—Vegetables—Fruits.

As the Philippine Archipelago lies between the fifth and twenty-first degrees of north latitude, with a great range of elevation and variety in the composition of soil, it necessarily presents marked variation in its vegetation, both in the forest and in the cultivated field. A crop report, if in any measure complete, would contain the names of many crops entirely unknown to the more temperate zones of the United States, while such staples as wheat, corn, and oats would scarcely appear at all. In general, the flora is tropical, while in the southern part it becomes equatorial. There is also a marked difference in the vegetation between that produced on the Pacific coast and that of the China sea. In the former region the rainfall is both greater and more frequent than in the latter, and as on the eastern coast the mountain ranges crowd close to the sea its agricultural area is limited.

Rice.

Next to hemp, which has been treated elsewhere, rice is perhaps the most important crop raised on the islands, and constitutes the staple and almost exclusive food of the natives, as indeed of most of the uncounted millions of the poor people of the entire Orient, and there is practically no limit to the demand.

Rice is said to have in the East not less than 1,300 different local names, and it is said that Bengal alone has displayed 4,000 distinct forms of rice, which differ as to color, shape, size, etc. In the Philippines over 100 varieties are cultivated. These are divided into 2 groups—the highland rice, grown where irrigation can not be used, and the lowland, that depends upon irrigation. The yield from seed varies from 40 to 100 grains of crop to 1 seed, a fifty-fold increase being considered a good average. A family of 5 persons will consume about 250 pounds of rice per month, being used in almost every native dish, and takes the place of bread. The unhulled rice is fed to horses, cattle, and fowls.

The condition of the rice industry is such that it requires the earnest attention of the government, for, owing to the ravages of war, the loss of the carabao, and the primitive and laborious methods that have hitherto been employed, the crop has not been sufficient to meet the demand, and large shipments have been made from China in order to feed the people. The deficit for the year 1902 amounted in value to something like 4,000,000 pesos. It is strange that with its fertile soil and the abundant supply of water, both from the clouds and from streams, the islands have never been extensive exporters of rice.

The agricultural bureau of the Philippines has made close inquiry into the methods followed by native planters, and has endeavored to improve the situ-

ation by the introduction of some new and productive varieties of seed rice, but the root of the evil lies chiefly in the methods of cultivation followed. The importance of this staple crop is such that it is the purpose of the bureau to make a thorough investigation of the various methods now in vogue in the Orient in rice culture, and especially of the methods which permit French Tonquin to produce a sufficient quantity to provide for the wants of its dense population and to permit an annual exportation valued at \$18,000,000 gold.

Rice growing is one of the few occupations which the natives pursue with extreme care, though the crude appliances employed do not permit great profits to accrue to the cultivator. The Philippines, like most oriental countries, have pursued the policy that human labor is cheaper than machinery, and therefore everything is done by hand. With the exception of land cultivated by the Igorots, but one crop is produced in a year, and that is grown during the rainy season. The land is allowed to remain idle during the dry months and grows up with weeds, Bermuda grass, etc. When the rain commences the water is allowed to stand in the paddies, and when the ground becomes thoroughly saturated with water it is plowed, carabaos being the draft animals employed. The plows are very crude—being little more than a forked stick to which is attached a cast-iron point. The first plowing simply scratches the sod; the second, at right angles to the first, breaks it still more, though there is no deep plowing or turning over the soil, and after plowing several times the land is harrowed with a bamboo harrow, this implement being constructed of the larger basal joints of a species of bamboo which has numerous stout branches at each node, these branches being cut off 10 or 12 inches from the joint and the several pieces of bamboo lashed together with rattan.

The rice is first propagated in specially prepared paddies and from these to the paddies in which it is to be grown, a few young plants being thrust into a hole made in the soil and the earth slightly packed around the plants, which are planted a foot or two apart each way, all this work being done by hand—imagine an American farmer transplanting 10 acres of sprouted wheat by hand.

All the work of harvesting is also done by hand, the heads being gathered one by one, and when tied into bundles is known as "palay"—that is, unhulled. Much rice is bought and sold in this condition, especially in towns where there are large rice warehouses and rice-hulling machinery. Practically all the rice for local use, however, is hulled by hand by pounding the palay in great mortars, this work being mostly done by the women of the household, who pound out what is needed for food day by day, or, at most, an amount that will last for a week or two. In and about Quiañgan, Nueva Vizcaya, the Igorots, by artificial irrigation, produce two crops each year, their rice being of superior quality, with larger, practically awnless heads and larger grains than are seen elsewhere. The locust is a formidable enemy to rice, sometimes destroying an entire crop, causing great suffering among the poor. It is the opinion of the agricultural bureau that rice cultivation can profitably employ modern machinery. The soil can be plowed, the grain can be drilled, and the crop harvested and thrashed, as is done in the fertile rice districts of Louisiana, where profitable returns are secured by these methods. There can be no question but that through the object lessons constantly given by the government farms the condition of rice culture will constantly improve, to the marked benefit of the manner of life among the people.

Corn.

Corn is a cereal which sometimes gives abundant crops, its flour making excellent food, and the Visayans make an alcoholic drink from the grain, which they call "pangasi." It is indigenous to America, whence it was brought by the Spaniards. The natives at first looked upon it with indifference, until, on account of the frequent loss of the rice crop, they became accustomed to its use, and in time its cultivation became quite general throughout the archipelago, especially in those regions where the soil is not altogether suitable for the cultivation of rice—as in Cagayan and Isabela.

Sugar.

The importance of the sugar industry in the Philippines is generally recognized. The splendid results that have been obtained in Hawaii for many years have focused attention upon the sugar possibilities of the Philippines. In 1900 the islands produced all the sugar required for domestic consumption and a surplus for export which amounted to a trifle over 60,000 long tons. With the

exception of hemp, this industry gives employment to more of the rural population than any other branch of agriculture. The fact that the area devoted to cane has been reduced, owing to vanishing profits, has entailed suffering in the rural districts that has extended far beyond the landed proprietor or owner of a sugar estate. Abandoned cane fields and idle mills throughout the archipelago indicate a depression of such magnitude that active steps are being taken by the government to rehabilitate the industry and make it show a balance on the right side of the ledger.

The poor state of production in which the archipelago stands with relation to other countries depends, in a large measure, upon the deplorable system of cultivation. In the Philippines there is scarcely known, much less employed, a single one of the thousand well-perfected agricultural machines, the use of which in other countries is general. For this reason the work is done in an imperfect manner. There is, in fact, no system of agriculture, properly so-called, and the greater part of the people have no idea of what agriculture really means. The carabao is used to haul a wooden plow (as old as the pictures on the temple walls of Egypt) through the ground. The plant receives but little cultivation, and is allowed to take care of itself until harvest time, and the same crude, slipshod methods are employed in extracting and crystallizing the juice of the cane. The cane is crushed by being passed through mills or cylinders of wood or stone, with intermeshing teeth, which extract only about 70 per cent of the juice, which is collected and boiled in open kettles, a little lime being added to purify it. When the boiling has reached a certain point it is passed to a second kettle, where the boiling is continued until it reaches a certain stage, recognized by those who are considered experts in the business. It is then poured into conical molds, which are placed upright, so that the molasses may drain off. These molds are placed over small jars, where they remain until the sugar is formed, it being then free from molasses.

It will be seen, therefore, that there is opportunity for vast improvement in these methods, and something has already been accomplished. The cane grown has been confined to the green and yellow varieties of probable Japanese origin. These canes, though rich in sucrose, are generally small and insufficient in tonnage yield per acre. Furthermore, whenever there is a steady decrease in size from lack of proper cultural methods the deterioration is accompanied by an increase of fiber, which represents a further loss at the mill. The many useful striped, rose, and purple canes that have contributed to bring Hawaii to the fore as the most prolific and profitable sugar region in the world have not yet been cultivated in the Philippines. Through the enterprise of Capt. George P. Ahern, chief of the forestry bureau, an importation of Hawaiian canes has been made, and by the rapid propagation and further introduction by the bureau of agriculture distributions of these improved varieties will be made to planters.

With the possible exception of tobacco, there is no staple agricultural crop where the physical condition of the soil plays so important a part as it does in the growing of sugar cane. It is a plant that, by virtue of its great size and rapid growth, not only drains heavily upon the fertility of the soil, but its shallow root system and restricted area for each plant demands that the mechanical condition of the soil be such as to facilitate in every way the full exercise of the root's functions. In all regions and in all sugar-producing countries a strong, deep, argillaceous or slightly calcareous soil has always been found best suited to meet these requirements.

In the sandy, sedimentary, alluvial soils along the seacoast, or in rich mountain valleys heavily charged with the humus in which the cane rejoices, phenomenal crops are often taken, but for long-continued cropping and with a minimum of restoratives the soils first mentioned are those which have longer withstood the crucial test of time. Such lands as these abound in the archipelago, and often extend for miles along the lower and easily cultivated foothills, and offer a more inviting field of operation than many of the apparently more alluring valley lands along the coast. For the purpose of improving the management of existing sugar plantations and the intelligent establishment of new ones the Philippine bureau of agriculture has published, in both English and Spanish, a primer on the cultivation of sugar cane, which treats in a simple, clear manner of such important subjects as soil conditions and fertility, preparation of the soil, selection of seed cane, planting, after treatment, harvesting of the crop, management of the stubble, drainage, irrigation, etc. This work, in connection with the instruction given in agricultural schools and the example of proper cultivation as demonstrated on the government farms, with the introduction of modern machinery, both farm and manufacturing, will in a short

time produce a marked change for the better in the sugar returns from the archipelago. It is impossible to state how much land is adapted to the growing of cane or how long it will take to develop the industry before the Philippines become one of the important sources from which to draw sugar. However, with a soil and climate second to none, a reasonable supply of labor, and especially if the Congress of the United States should lower the present rate of duty upon sugar imported from the Philippines, the development of the industry will be constant, if not rapid, and may well engage the attention of those interested in sugar production.

Under the present government means have been provided for perfecting and transferring titles. The Philippine Commission has enacted legislation, subject to the approval of Congress, by which government land to the amount of 2,500 acres may be acquired by a single corporation, and it is thought that all of these influences will contribute to the rehabilitation of the sugar industry. Its growth, however, will, under the most favorable circumstances, be so gradual that the sugar growers of the United States, both of beet and cane, need have no fears of competition so serious as to endanger their business. There is an abundance of room for both, for it will be many years before the annual consumption of the United States can be raised on American soil.

Although sorghum, or batad, has given excellent results in the United States and elsewhere when cultivated for sugar or the production of alcohol, it is used in the Philippines only for fodder.

Tobacco.

Tobacco leaf, cigars, and cigarettes have formed a considerable item in the exports of the Philippine Islands. Until the year 1882 the Spanish Government had a monopoly of the tobacco industry, and much of the discontent that existed up to that time among the natives was due to the tobacco monopoly laws which were on the statute books and the vigorous manner in which the officials enforced them. The natives in whose provinces where tobacco could be produced advantageously were compelled to plant a certain amount of land in tobacco, and the entire product of the islands was required to be delivered to the government warehouses, where payment was made at prices arbitrarily fixed by the Spanish Government. Each unmarried man who cultivated tobacco was required to set out 4,000 plants each year, and each married man was required to set out double that number. There were government inspectors who supervised the planting, cultivating, and harvesting of the crop, and who also required that it be packed in a certain way and shipped at a certain time to the government warehouse.

The natives were not permitted to use the tobacco which they grew. Penalties were provided for those who smoked cigars and cigarettes, and it was not an uncommon thing for a native engaged in tobacco raising to be put in jail for smoking a few leaves which he had raised himself and which he had rolled into a crude cigar or made into a cigarette. The price paid by the government for tobacco under the monopoly was about one-half what is now paid. During a good portion of the time the monopoly was in force, particularly the latter part, payment was made in scrip, redeemable at the option of the government. For a number of years this scrip was paid out with a fair degree of promptitude, but after a time payment was deferred for so long a period that it often sold for one-third of its face value.

The injustice worked through the tobacco monopoly in the Philippine Islands became so great, and the natives had become so incensed over the unjust treatment accorded them, that finally the Spanish Government was compelled to abandon the monopoly, which was done by royal edict in December, 1882.

The tobacco business is now conducted as any other industry in the islands, and large factories have been erected for the manufacture of cigars and cigarettes. This is one of the important industries of Manila, which practically controls the manufacture and export of tobacco, and many people are thereby given employment.

From its monopoly of the tobacco industry the Spanish Government derived a revenue which for several years amounted to about \$4,000,000 annually. The number of officials employed in this branch of the service alone exceeded 400. The cutting off of this source of revenue proved so serious a blow to the finances of the islands that it was found necessary to increase taxes in other ways. License fees were increased, the cedula, or head tax, was made heavier, and an export tax on leaf and manufactured tobacco was put in force.

The cigars manufactured in Manila are sold at a very low price. The average price lists of the various manufacturers in Manila show a range of from \$10 to \$75 silver per thousand. The ordinary cigar of Manila, of fair quality, sells for about \$4 silver per hundred, or less than 2 cents apiece in United States money. There is but little tobacco and few cigars shipped from the Philippines to the United States. Freight charges, customs dues, and internal-revenue taxes so increase the cost that they can not compete with American-made cigars. In China, Japan, and India, Manila cigars are used almost exclusively, and there is a constant increase in the export of both leaf- and manufactured tobacco. Since August 13, 1898, the date of American occupation, to June 30, 1902, cigars were exported to the following countries from the Philippines:

	Value.
United States	\$22, 453
United Kingdom.....	1, 617, 559
China.....	855, 753
Hongkong.....	893, 534
Japan.....	107, 543
British East Indies.....	558, 848
Australasia	790, 900

Smaller amounts were also exported to many other countries, making a total value of \$5,399,759.

Since the abolition of the monopoly the tobacco industry has increased in all regions to an extraordinary degree, both in quantity and quality of the product. As a result of the Habana school of gathering, curing, and manufacturing the leaf, the product has become popular throughout the country. A full knowledge of the fermentation or preparation of the leaf is still lacking, or perhaps this work is carried out under adverse conditions, so that the leaf has not acquired the full aroma and strength of the Habana leaf, but the different processes are constantly being improved.

When the Philippine Commission made a journey up the Cagayan Valley, in Luzon (1901), it was informed that practically all the good tobacco lands were under cultivation, and among the natives the "good land" was understood to be those parts fertilized annually by the overflow of the river. It was stated that the other land was not considered first class, because it would only produce tobacco for ten or twelve years without enrichment, the subject of fertilizing never having received any attention from the planters of that region.

The qualities which determine the price of tobacco are combustibility, strength, aroma, fineness, elasticity, color, and uniformity. Intelligent and experienced direction by practical men, with scientific aid in the matter of seed selection, instruction in cultivation, curing, and marketing, such as will be furnished by the bureau of agriculture, will enhance the quality and value of Philippine tobacco until it will become second to none, for already the leaf from the provinces of Isabela and Cagayan compares favorably with that of the Vuelta Abajo district of Cuba. That from the Visayan Islands is coarser, more intense in color, and stronger in taste, while the leaf from the Province of Nueva Ecija is fine, but rather bitter in flavor and yellow in color.

Don Rafael Maramag, the president of Ilagan, states, in the Commission's report for 1901, that the tobacco crop for the current year was very good; that in the Province of Isabela the land was for the most part in small holdings of from 1 to 1½ hectares, and that a hectare of tobacco land would produce in an ordinary season about 60 bales of tobacco, worth \$6.50 Mexican per bale, of which over one-half would be profit. So the crop is an extremely profitable one, especially for families with small holdings, where much of the labor can be performed by the women and younger children of the family. Tobacco growing on a large scale would afford opportunity for the employment of much improved and labor-saving machinery.

Coffee.

Coffee has been cultivated in the Philippine Islands for more than a century. It was first planted in the Province of Batangas, and the same sad story of neglect and deterioration that has been told as to other products of the islands is repeated in the history of coffee culture. This crop has suffered from lack of proper transportation facilities, for competition in all crops is now so active that none of them can overcome the handicap of high freight charges, and every neglected field is a silent argument for better roads and harbors. For many

years but little attention has been paid to coffee growing, notwithstanding the fact that the neighboring island of Java became wealthy through coffee and set the standard of excellence for the world.

The remarkable extension of coffee planting in almost every part of the Torrid Zone has so increased the supply that only the better qualities can command remunerative prices, and this fact lends hope to the future development of this industry in the Philippines, for its berry compares favorably with that of Java or Martinique, and there are certain favored localities which produce coffee which, according to the judgment of experts, can be compared only to Mocha.

The red fertile lands of the mountain sides, resembling the best coffee lands of Porto Rico, with a porous subsoil, where the rainfall is abundant and regular, with an ideal climate for the coffee tree, is an alluring prospect. Until a few years ago this was an important industry in various parts of Luzon and other islands of the groups. In 1801 an insect made its appearance in the coffee plantations which destroyed the trees, and practically all of the big coffee plantations have now been abandoned. When the industry was flourishing over \$4,000,000 worth was exported in a single year, while since the date of American occupation to June 30, 1902, but \$23,102 worth found its way to foreign markets. There is no question that with scientific attention directed to the matter, means would be found to overcome the ravages of this insect and enable trees to grow and render tribute to the wealth of the islands.

As coffee is one of the most important of the tropical commodities imported into the United States, which under no possible condition can be raised in any of the States, it would seem to be good policy to direct legislation so that the market of the United States should be the market where its insular possessions could dispose of their surplus products. In 1902 there were imported into the United States 1,090,636,832 pounds of coffee, valued at \$70,919,257.31, all of which was entered free of duty. It has been urged in the Congress of the United States that a duty be placed on coffee imported from foreign countries, and allow it to enter free from the insular possessions. Under the stimulating influence of such a policy, applied not to coffee alone but to rubber, hemp, sisal grass, gutta-percha, copra, cacao, dyewoods, etc., and other products of the field and forest, of which the United States imports annually to the value of from \$150,000,000 to \$200,000,000, and all of which is now on the free list, Philippine agriculture would be revolutionized and the islands enabled to rival Java in the wealth of the their products.

An especially fine coffee is grown on the mountain regions of Benguet and Bontoc and in the Province of Lepanto. The trees yield heavy crops, and unhulled coffee sells readily in Manila at \$35 Mexican per cavan, for local consumption or for shipment to Spain, where the Philippine berry is highly appreciated. The coffee comes into bearing in Benguet in three years, and there is no region in the United States which has a more healthful or delightful climate than is afforded by the Benguet highlands, where a white man can perform heavy field labor without excessive fatigue or injury to health.

Coffee can be grown on most of the islands where there are timbered gulches or ravines and up to an elevation of 2,000 feet. The machinery required for the proper marketing of coffee is so simple and cheap that it figures very little in the expense, and even the poor natives could raise and market coffee with but little instruction.

There are few sights more beautiful than a well-conducted coffee plantation in full bloom. Neither the blush of the apple blossom, the snowy plum, nor the pink of the peach can compare with the exquisite beauty of the coffee tree, where nature has excelled herself in combining those rare qualities which delight the eye, tickle the palate, and render good return for the labor and capital invested.

Cacao.

The cacao grown in the Philippines is of such excellent quality that there is keen rivalry among buyers to procure it at even an advance of quite 50 per cent over the price of the export grades of the Java bean, and this notwithstanding the failure on the part of the local grower to "process" or cure the product in any way. In parts of Mindanao and Negros, despite ill treatment or no treatment at all, the plant exhibits a luxuriance of growth and wealth of productiveness that demonstrates its entire fitness to be considered a most valuable crop in those regions.

The importance of cacao growing in the Philippines can hardly be overestimated, as recent statistics place the world's demand for cacao (exclusive of local consumption) at 200,000,000 pounds, valued at more than \$30,000,000 gold. There is little danger of overproduction and consequent low prices for many years to come. So far as known, the areas where cacao prospers in the great equatorial zone are small, and the opening and development of suitable regions has altogether failed to keep pace with the demand.

Cacao is cultivated in a small way nearly everywhere in the archipelago. It is grown in several provinces in Luzon, in Mindanao, Jolo, Basilan, Panay, Negros, Cebu, Bohol, and Masbate, and its presence can be reasonably predicted upon all the larger islands anywhere under an elevation of 3,500 feet. In most cacao-producing countries its cultivation has long since passed the experimental stage, and the practices that govern the management of a well-ordered cacao plantation are as clearly defined as are those of an orange grove in Florida or a vineyard in California.

In widely scattered localities the close observer will find in the Philippines many young trees that in vigor, color, and general health leave nothing to be desired, and with due precaution and close oversight there is no reason why the growing of cacao may not become one of the most profitable horticultural enterprises that can engage the attention of planters in the Philippines. The cacao loves to "steam and swelter in its own atmosphere," and a bulletin has been issued by the agricultural bureau of the Philippines giving instructions as to how to select the locations best adapted to the growth of the plant and the soil, drainage, and general attention required.

The cacao, relatively to the size of the tree, may be planted very closely, for it rejoices in a close, moisture-laden atmosphere, and thus permits a closer planting than would be admissible with any other orchard crop.

There are a number of varieties of cacao in general cultivation, which may be referred to three general types—the criollo, forastero, and calabacillo. The criollo is undoubtedly the finest variety for general use. On breaking it is found to be whitish or yellowish white, while the seeds of those plants in which the forastero or calabacillo blood predominates are reddish, while the forastero is almost violet in color. For flavor, freedom from bitterness, facility in curing, and high commercial value the criollo is everywhere conceded to be the best. The others, however, yield better, are more vigorous, and not so liable to disease.

The bulletin describes the method of planting, cultivation, pruning, and harvesting the crop. Attention is also given to the enemies and diseases of the cacao, and among the former are mentioned monkeys, rats and parrots. The estimated cost and revenues derived from a cacao plantation are given for a series of years, and the bulletin concludes with the statement that "the difference between good returns and enormous profits arising from cacao growing in the Philippines will be determined by the amount of knowledge, experience, and energy that the planter is capable of bringing to bear upon the cultivation in question."

Chicle.

The extraordinary demand that has sprung up within a few years for gum chicle has added another article to the long list that is being supplied by the Tropics. The consumption of chicle has become so great that the propriety of calling it a minor product may well be questioned. It is the foundation of all the fine chewing gums in the market, and practically all the gum raised is sent to the United States and used by the American Chicle Company, which combines it with starch, sugar, and flavors, and in this form it finds its way around the world and to an ever-increasing number of victims to the harmless but unlovely gum-chewing habit.

The tree that produces gum chicle is *Achras sapota*, which also produces a fruit prized in many Philippine gardens, known as "chico." It is grown largely for its fruit, and the natives are generally ignorant of the far greater money value of its abundant milky sap or latex. The tapping of the tree, the collecting of its elastic sap, and the preparation of the gum involve none of the complicated processes required for the coagulation of rubber and are extremely simple. It is estimated that 3 or 4 pounds of gum can be withdrawn from a full-grown tree without injury, provided the tappings be conducted between January and July.

Multiplications by seeds or cuttings is tedious and, except in skilled hands, uncertain; but Filipino gardeners employ a system of marcottage that is worthy

of a brief description. The process is to split in halves a single short joint of bamboo and then encircle a branch or limb of the tree with the two halves and then tie them together with rattan. This makes a cylinder around the stem, and the bamboo being cut at a joint is practically closed at the lower end. Before placing the tube, the leaves are stripped from that portion of the tree where it is to be tied and the bark of the branch slightly nicked with a knife.

The tube is then filled with fine, light soil. In a few months the tube will be full of roots and the branch, cut off below, is ready to set out, and is a young tree of a size and vigor that could not be expected in less than two or three years from seed.

This undeveloped industry promises to become important in the Philippines, and as gum chicle is on the free list of the United States tariff, it could be made to be a source of handsome profit to the grower.

Stock-raising and grazing lands.

Stock raising in the Philippines, like the same industry in Cuba, must be built up anew, as a result of the ravages of war, to which in the former place must be added the loss occasioned by the rinderpest, which carried off about 90 per cent of the cattle of the islands. Prior to the outbreak of hostilities one writer stated that he saw herds of cattle and horses, and droves of sheep, goats, and pigs everywhere. General Otis also in his report speaks of large herds of cattle, and that some localities are distinctively cattle-raising districts. Fine grazing lands are to be found in eastern Pangasinan, northern Nueva Ecija, Nueva Vizcaya, Isabela and Cagayan, and probably in other provinces of Luzon, and certainly other islands. In the three provinces first named are rolling uplands, and in the latter broad, level prairie lands, although as far as abundance and quality of the grasses are concerned there is apparently no difference—the same species growing both on the prairies and hills. These grasses consist of one or two species of *Panicum* and *Eragrostis*, and many representatives of several genera of the *Andropogoneæ*, all fine-stemmed, fine-leaved grasses, which in the United States would be popularly known as "bunch" grasses, as they grow in small tufts, not being truly turf forming; yet there is sufficient of the latter to prevent gulying or washing, notwithstanding the heavy tropical rains to which the region is subject. Near the streams and in the river valleys, about rice paddies, etc., Bermuda grass is abundant, and near the coast Korean lawn grass is found everywhere.

The grazing lands in eastern Pangasinan, northern Nueva Ecija, and throughout Nueva Vizcaya are characterized by their hilly, rolling character, the ravines and small valleys, tops of the higher hills, and surrounding mountains being densely forested. In every small valley one finds streams of clear, pure water, it being impossible to travel more than 3 or 4 miles in any direction without finding good water. Hence, it will be observed, that there is an abundance of feed, water, and shelter—the requisites for an ideal cattle country—and especially to be noted here are the topographical features of the country, which, in case of epidemics of rinderpest, are of especial value, as in these valleys whole herds of cattle can be isolated and, with a little care and watchfulness, guarded for months against infection by contact or through the water supply.

The water supply is especially to be noted, as in the numerous mountain streams the water is perfectly pure and as clear as crystal, except immediately following a heavy rain. These streams during the rainy seasons, like the great rivers, are subject to great and sudden rise and fall, and from a quiet babbling brook one may change in a few minutes into a raging mountain torrent; yet where the mountains are heavily timbered the rise and fall are more gradual and do not go to extremes.

The grazing lands of Isabela and Cagayan differ from the above in being almost perfectly level, or but gently rolling, typical prairie lands, extending almost as far as one can see in all directions, limited by the coast range on the east and the great central range on the west, and extending from some distance south of Cordón north to the coast. The same species of grasses are found here as in the ranges of Nueva Ecija and Nueva Vizcaya, and the quantity and quality are about the same. This great valley consists of open country with isolated trees, or sometimes small groves, with more or less forest land along the streams. The country is well watered by the numerous tributaries to the Cagayán River. In this valley the unbroken ranges are far more extensive

than in the mountain regions, but at the same time in case of an epiderm rinderpest there is not the same opportunity of isolation as a means of protection against the disease.

Cattle raising for the home market should be a very profitable undertaking in northern Luzón, if one can judge by the prevailing high prices of meat in Manila, and the fact that practically all the meat consumed is shipped in on hoof from Singapore or as refrigerated meat from Australia and the United States. Certainly the conditions in Luzón are ideal for this industry, and grazing lands of the island can not be surpassed by any in the world and are certainly not equaled by 90 per cent of the grazing lands in the United States.

Hundreds of acres in these open ranges in some sections would produce great abundance of native hay, and once the question of transportation is solved the Manila market could be cheaply and easily supplied with thousands of tons of it, as in many sections under natural conditions there would be a heavy yield of a fine quality of hay per acre, the natural lay and condition of the land being such that cutting and harvesting could be done by machine. At present the thousands of tons of hay needed in these islands for the support of native ponies and especially for United States army horses and mules, are imported from the United States and Australia.

Under the name of "zacate" are included several species of grass which produce the forage of the live stock, especially horses. The chief ones of these belong to the genus *Leersia*. The zacate fields are objects of much care on the part of the native farmers, especially if in the vicinity of large towns, as the returns are excellent, and the grass may be cut several times a year. The cogon grass (*Saccharum* species) reaches a height of 2 meters or more, forming a dense jungle almost impossible to traverse. The natives, with the object of obtaining fodder, are accustomed to set fire to these grass fields in the dry season and are thus enabled to obtain the young shoots, which are much relished by the cattle. In regions where the nipa does not grow, cogon is employed for thatching houses.

The native horses are small but very strong, resembling those of Java, and endure a great deal of hard treatment. No attention is paid to the breed or blood, and no doubt much could be done in this direction by importing from other lands such animals as seem best adapted to thrive in the climate of the Philippines. The ever present and indispensable carabao is also susceptible of improvement, and breeding animals have been imported by the government for this purpose. Hogs are also raised, or rather allowed to propagate, in the same careless, slipshod manner that characterizes all other insular industries.

Essential oils.

Among the other products of economic value in the Philippines are a number of essential oils, but the most important is that produced from the blossoms of the ilang-ilang tree. It is botanically known as *Cananga odorata* (Hook) and belongs to the custard-apple family. It grows both in a wild state and under cultivation, bearing leaves about 2½ inches wide by 6 inches long, and yellow blossoms some 3 inches long and of extraordinary fragrance, from which is distilled the attar of ilang-ilang.

The attar of roses, the famed essential oil of the Damask rose of the Balkans, finds a competitor in this Philippine product, considered by some as its equal in perfume, gives a greater yield of essence, and is therefore a less expensive basic element for the perfumer. The ilang-ilang, while indigenous to many parts of tropical Asia, grows best in the Philippines, where it is a favorite with the natives. The tree is common to many localities south of Manila, being found chiefly in the well-populated islands and provinces, and it is said that it thrives best near human habitations. It is propagated in plantation by seeds or cuttings placed about 20 feet apart in each direction, and grows rapidly in almost any kind of soil. The flowers appear in the third year, and when the tree is 8 years old it will yield as high as 100 pounds of blossom. It blossoms every month, but the best period is from July to December.

The process of converting the long yellow petals into essence is by the simplest form of distillation, no chemicals being required. The oil vaporizes in a closed boiler at a temperature of 220° F. The first quality must be clear as distilled water and of course fragrant, while the second grade is somewhat yellow and smoky. The oil is drawn from the bottom of a glass separator, filtered through talcum, and is then ready for market. About 75 pounds of flowers will yield one pound of oil. The flowers are worth from 8 to 15 cents gold per pound, and

it costs about \$4 to manufacture. It is practically without competition in the markets of western nations and readily sells at from \$40 to \$55 per pound, the supply being unequal to the demand. The perfumes of Europe and, to a less degree, those of the United States, make it the basis of some of their most expensive extracts. There are flowering groves in many parts of southern Luzon and the Visayan Islands, and the tree abounds in the vicinity of Manila.

Among the oil-producing plants of the archipelago the cocoanut easily holds the first place, as its various products satisfy so many industrial, economic, and medicinal wants. It belongs to the palm family and many varieties are found in the Philippines, especially in the Visayan Islands, where they have local names. An analysis of the meat in the cocoanut, according to Buchiver, is as follows. Water, 31.8 per cent; stearin and olein, 47 per cent; albumen, sulphate of calcium and sulphur, 4.3 per cent; potassium and other salts, 11 per cent; insoluble woody fiber, 8.6 per cent. The nuts are collected every four months, and transported, if possible, by water, when rafts are made of the nuts themselves, having simply a netting around them to keep them from separating, the owner riding on top.

Benne seed (*Sesamum indicum* L.) has been known in the Orient from the most remote times and is to-day cultivated in all tropical countries. The seeds of this plant contain as much as 53 per cent of fixed oil, which is somewhat similar to olive oil and is often mixed with the latter to adulterate it. It has a sweet taste, although more insipid than olive oil, and becomes rancid very slowly. In Egypt, Japan, and other countries it is used in cooking in place of lard or olive oil. It is excellent for making soap, and is also employed as a cosmetic and in the preparation of medicinal emulsions. The residue left after the extraction of the oil is used as a fertilizer, and is also an excellent food for fattening cattle. Of that cultivated in the archipelago but a small quantity is exported.

Lumbang (*Aleurites triloba* Bl.) is cultivated for the oil, which is extracted from its seeds. This oil is of good quality, is used for illuminating purposes and for calking ships, and is an excellent substitute for linseed oil in the preparation of pigments. It is exported to China. The castor-oil bean (*Ricinus communis* L.) is grown in the Philippines, and its seeds produce about 40 per cent of their weight in oil, which is used as medicine. A reddish oil, very useful for illuminating, is also extracted from the seeds of a tree (*Jatropha curcas*) and which bears different names in different parts of the archipelago.

The peanut is a native of Lower Guinea, from whence it was carried to Brazil, and is now cultivated in all America, the southern part of Europe, Asia, and Oceania. In the Philippines it is cultivated on a small scale, but chiefly as forage for cattle. If the cultivation, however, is carefully conducted, the seed will yield half its weight in an oil, which the natives often mix with cacao in the manufacture of chocolate.

The nutmeg grows without cultivation in Cebu and in the Province of Laguna, and under culture will flourish in all parts of the islands. In the Dutch East Indies, where the cultivation of the nutmeg has received the greatest attention, the plant or tree attains to a height of 40 feet. The trunk is covered with a thin, dark bark, slightly mottled in appearance, and when cut exudes a red juice which coagulates on coming in contact with the air. The fruit in size resembles a small peach, having a thick husk and a hard pit about the size of an almond within which the nutmeg is formed. This is enveloped in an aromatic skin or membrane known to commerce as mace. From the beautiful flowers of the tree, which are aromatic, the natives make a preserve which is noted for its fragrance.

The cinnamon tree is also native to the Philippines, being found in abundance in Mindanao. In Zamboanga, Caraga, and in the mountain districts of Misamis varieties of cinnamon of stronger taste and fragrance than that of Ceylon are found, although it contains a bitter element which depreciates its value, but this might be eliminated by cultivation. The cinnamon of commerce is the outer bark which has been stripped from the young branches. Pepper also is produced in many parts of the archipelago, but little is exported, as sufficient attention has not been paid to it to enable the Philippine product to compete with that raised in other parts of the East Indies.

Indigo and other dye plants.

Among the dye-producing plants, indigo, a native of India, holds an important place. The juice extracted from its leaves and young stalks furnishes the well-known dye so much used in the industries. Indigo is produced in Bataan,

Batangás, Bulacán, Laguna, Pangasinán, Pampanga, Zambales, and Ilocos Norte and Sur. The plant has small, slender, round leaves, whose tips are colored, and produces little, slender pods full of seeds. Although the plant grows in temperate climates, two or three crops a year may be obtained in warm, moist regions as against one in temperate zones. The most suitable ground for the cultivation of the indigo is that having light, deep soil, as the roots of the plant ramify but little, the central long root penetrating deeply into the soil. The land should be free from trees, so that the sun's rays are not obstructed, for under such conditions the juice of the leaves and young stems is more abundant. As the coloring matter is extracted principally from the leaves, these should be collected as soon as they are completely formed and before the fruit appears. The indigo in the leaves is without color and in solution. When the juice is extracted from the plant it is yellowish in color, but on being exposed to the air it changes successively to yellowish green, green, greenish blue, and finally becoming insoluble, it falls as a blue precipitate to the bottom of the vessel, about thirty hours after the extraction of the juice.

The sappan also furnishes from its woody trunk a coloring matter similar to campeachy or logwood, which is employed in dyeing cotton or wool. It is very abundant in the forests of the Philippines, and some excellent varieties are found which produce a color more highly valued than that of the Brazil woods. It is an important article of export to China and England, the former country using it in dyeing silks, damask, and other fabrics woven in China.

The safflower, or lazar, is a plant of the family *Compositæ*, called also "bastard saffron," and in the Philippines "biri." It is valued and cultivated for its stamens, which contain three principal coloring matters—two yellow, soluble in water, and of little value, and the third red, soluble in alkalis and of greater importance. It is used in the adulteration of saffron.

The natives extract dyes from various other species of wood. From the bark of the tree called "bagalibas" a dye is obtained, which will give cloth a fine tawny color. The prepared bark of the tree called "dayagao" makes a fine mordant, which imparts a luster and great stability to cloth dyed black, yellow, or red. Belolo, dugna, and hagur are much used by fishermen for dyeing and strengthening their nets, which take on a dark-brown color, and are rendered less susceptible to rotting.

Mongo.

Leguminous plants are of but little importance in the Philippines. One exception is the commonly cultivated mongo (*Phaseolus mungo* Linn.), smaller than the lentil, but of the same flavor, which is cultivated on a large scale, it being the principal food of many towns. The butingui is the true kidney bean, and is found in considerable variety in Philippine gardens. The zabache is also highly prized, and the sitao produces a vegetable about a foot long. The patani and the frijol from Abra are also appreciated and cultivated.

Sweet potato.

Although the origin of the sweet potato (*Ipomœa bataas* L.) has been much discussed, it is believed to have come from Mexico, and this tuber is greatly favored by the mountain races of the islands, which seems to indicate the antiquity of its introduction. The plant grows in five or six months, extending its shoots in all directions, completely covering the soil with its abundant leaves, which are also edible. Where the ground is given over to the exclusive cultivation of this plant, it is allowed to take root in all directions, and as the roots extend and grow the tubers continually, they may be dug up for use at any time. The potato (*Solanum tuberosum* L.) has not done well in the Philippines and is only cultivated with success in certain elevated localities such as Benguet.

Cassava.

The cassava is a native of tropical countries, whose roots contain an abundance of starchy fecula known as tapioca, whose good qualities are well known. In the Antilles, where it is known as yucca, it is cultivated with great care. The yucca or camoting cahoy, as it is called in the Philippines, grows well in both temperate and hot regions.

The plant is multiplied by means of buds growing from the knots on the woody trunk. The roots attain a considerable size, and while they are still

fresh they contain a milky juice which is poisonous, but this disappears upon boiling or upon exposure to the air for twenty-four hours, leaving the residue of the milky juice quite inoffensive.

In order to utilize the root as food it is necessary to grate it, wash it, and subject it to a considerable pressure to express the juice, and the material remaining after these operations is the flour, or tapioca.

Arrowroot.

Arrowroot, known in the Philippines as tagbac-tagbac, is also a producer of starchy fecula, sometimes called sago. It is an herbaceous plant growing about 1 meter in height, having lanceolate leaves about 15 centimeters in length, similar to those of the banana plant. The part of the stalk underground gradually diminishes in size, to the point of insertion, into a long, horizontal, fleshy, white tuber, which contains a considerable quantity of fecula.

Buri.

The buri (*Corypha umbraculifera* L.) is celebrated all over the archipelago, giving name to the island of Burias, where it is abundant. It belongs to the palm family, growing to a considerable height, is very beautiful, the trunk being adorned with an extended bunch of leaves that are green in color, though the young ones are white. It grows spontaneously in all parts, the natives never planting or cultivating. The leaves are very large, and extend from a single base in the form of a fan. It does not produce fruit until many years old and, like the century plant, after fruiting shrivels and dies. The fruit grows in bunches from the top of the tree, but is not edible. To obtain the starch, the tree is cut down at the root, and all the soft interior part of the trunk is taken out and placed while moist in casks or troughs, while some of the bitter substances are drained from it. It is then pounded with mallets, and the starch separates in the form of very fine grains. This is dried and made into flour, which serves as food, and may be purchased in the markets of the larger towns and is known to commerce as sago.

Bagsang.

There is also a palm (*Metroxylon rumphii* Mart.), locally called bagsang, which is common in the Visayan Islands, growing along the banks of rivers and in other moist regions, which provides food when there is a scarcity of rice. To utilize this product the tree is cut down and stripped of its bark, which is called boje, and which has many uses. The heart of the tree is then cut into strips, which are dried over a fire and saved for future use. When needed it is pounded in wooden mortars to a sort of a flour and made into cakes or fritters, which when eaten with cocoanut milk are both toothsome and healthful.

Fiber plants.

Among the fiber-producing plants mention has already been made of the hemp, which furnishes the largest single item of export and affords employment to thousands of agricultural laborers.

Cotton.

Cotton is cultivated in the provinces of Ilocos Sur and Ilocos Norte, Unión, Pangasinán, and Abra. The species cultivated are *Gossypium herbaceum*, *G. perenne*, and *Ceiba pentandra*. They are, respectively, herbs, bushes, and trees. The first is the only one which is really cultivated and whose product is used in the manufacture of cloth. The others are found growing wild, their cotton being used only for making pillows and mattresses.

Pineapple.

The pineapple, which is cultivated for its delicious fruit, also furnishes a fiber which is obtained from the leaf. The pineapple has about the same geographical distribution as coffee. It requires an even temperature and will grow on almost any sort of soil. In the West Indies it is cultivated for the fruit,

but in the Philippines it is more valuable as a textile plant. The leaves are cut off when they attain full size, and then scraped with a sharp instrument in order to separate the fleshy part from the fiber. The latter is then washed, dried in the sun, and combed out. It is classified into four grades, according to its fineness, and is employed in the manufacture of fabrics. The finer filaments are woven in very rough looms into a most delicate cloth, called "pina," which commands a high price and is highly prized in the Philippines.

Ramie.

Ramie probably had its origin in Java, Sumatra, or the southern part of China. It is a nettle, but without needles, and is cultivated for its fiber, which, like flax, is formed on the outer part or bark of the plant. In spite of the excellent quality of this fiber, cultivation has not increased, on account of the difficulty of extraction, which can only be done at a profit with special machinery. In the Philippines it is found in the Batanes Islands and in the northern part of Luzon.

Agave or Century Plant.

The agave, or century plant, whose original home was America, is cultivated on a small scale in certain localities in the Philippines. Its fleshy, sharp leaves, bordered with a row of spines, furnish a long, strong fiber from which a delicate cloth is woven.

Rattan.

Rattan of the genus *Calamus* is represented by several species called by the natives "dilan," "yantoc," "talola," "curag," and "palasan." These spiny climbing plants, which sometimes attain a length of 600 feet, furnish the natives with a useful material of most extended application. All the framework of the houses built of bamboo and nipa, and many of those built of wood, are held together by strongly laced bands of this material. These rattans, called "bejuco," are also employed in the rigging of all the smaller boats and in the making of rafts, etc. In some of the provinces hats and sacks are made from the rattan and in other places chairs and other articles of furniture. With plenty of bamboo, rattan, and a bolo, a native can fence his farm and build and furnish his house.

Bamboo.

There are few plants in the islands more important than bamboo. There are a number of species, but the most useful is the Cauayang tototo, which at times reaches a diameter of more than 20 centimeters and a height of more than 12 meters. It is employed chiefly in the construction of native houses, which are often made wholly of bamboo, with the exception of the rattan used to tie it together and the cogon or nipa used as thatch. The posts, floor, rafters, and doors are all of bamboo, which the natives employ with great skill. Either entire or split into stripes, it is used in the construction of boats, rafts, bridges, aqueducts, scaffolding of all kinds, baskets, furniture, fishing apparatus, arms, rope, etc. This plant, together with the cocoanut tree, the nipa palm, and the rattan are truly providential for these countries.

Garden plants.

Although the natives do not care much for the cultivation of garden plants, they are found near the large centers of population, being generally cultivated by Chinese and the products sold to Europeans. Among those cultivated are onions, garlic, asparagus, radishes, cabbages, artichokes, endives, peppers, tomatoes, carrots, celery, parsley, and the haras (*Faniculum vulgare*), a native plant whose fruit contains seeds having a sweet flavor similar to anise. Of the family of curcubitacæ there are also a large number of plants, among which are the common squash, of which there are several varieties. The genus *Cucumis* is represented by four species, one of which, called the "Tobacog" (*Cucumis melo*), is a true melon; but, while possessing a delightful aroma, never reaches the excellent flavor of the American melon. Cucumbers are also raised, and in Laguna the strawberry occurs.

The bureau of agriculture has been active in the work of distributing field and garden seeds, and during the season of 1902 nearly 20,000 packages, including

134 varieties, were distributed to the farmers and gardeners of the archipelago, with simple yet explicit directions as to planting and cultivating. Steps are being taken also to introduce from the United States and other countries small orchard fruits, and in the more elevated regions efforts will be made to grow the fruits of the Temperate Zone.

The recent discovery on the island of Negros of a native species of grape suggests the possibility of a line of fruit growing which has never been attempted. This wild grape, with great resistance to humidity and heat, possessing great productiveness and robust habits, may prove of inestimable value for the ultimate development of a race of grapes adapted to the islands and suitable either for the table or for the manufacture of wine.

Fruits.

Little attention has been given to the cultivation of fruit in the Philippines, but both the wild and cultivated varieties are abundant and will, under intelligent direction, be very much improved. One of the most highly prized fruits is the mango, which grows well in Luzon and in the Visayas. The fruit has a delicate flavor and an aromatic odor, the largest of them being fully 6 inches in length. In shape they are somewhat oval and flattened, the skin is smooth and yellow, and the pit, which lies in the center of the fruit, is almost as long as the fruit itself, but very thin. The leaves are long and wide, and an infusion of these is something like tea. There are a number of varieties of this delicious fruit. The other fruits worthy of mention are the following:

Anona reticulata L., the anona, an exotic from Mexico, its flesh being white, sweet, and fragrant.

A. squamosa L., called "ates," a juicy, aromatic, sweet fruit that seems to melt in the mouth. It is of American origin.

Diospyros discolor Willd., called "mabolo," whose reddish fruit is of a strong odor and about the size of a quince and whose wood is capable of taking a magnificent polish.

Garvinia mangostana L. This is an exotic, and grows only in the southern part of the archipelago and is called the "king's fruit," because so highly prized by the Moro sultans.

There are quite a number of other fruits aside from oranges, lemons, limes, bananas, guayabos, sapotes, for which no English names have been found, and the native names afford but little information concerning them.

[From report of the Philippine Commission, 1902, p. 302.]

AGRICULTURAL OPPORTUNITIES IN THE PHILIPPINES.

It is hardly necessary here to discuss the agricultural opportunities offered in these islands to corporations or individuals possessing large capital and able to cultivate upon an extensive scale such crops as sugar, hemp, and tobacco. But a small part of the soil capable of producing these crops to advantage is at present under cultivation. The methods of extracting sugar now used leave approximately 50 per cent of the sugar in the pressed cane when it is thrown on the dump pile. Hemp is cultivated in a haphazard way, where it is not allowed to grow practically wild, and the fiber is extracted by hand. No systematic and sustained effort has ever been made to improve the quality of Philippine tobacco, and the methods used in curing it are very primitive. If rich returns have been realized from the growing of these commodities in the past upon a comparatively limited scale, the results of extensive cultivation with modern methods and machinery are too evident to require discussion.

I desire to call especial attention to the opportunities here afforded young men of comparatively limited means to engage profitably in agriculture.

There are very large areas of government lands admirably adapted to the cultivation of cocoanuts. Coconut trees come to bearing in from five to seven years, reaching the bearing stage more slowly as the altitude increases. The trees can be grown readily and with comparatively little danger of loss. Under existing conditions, the minimum annual profit from a fairly good bearing tree is \$1 Mexican, and frequently two or three times this amount is realized. The ground under the trees is now either allowed to grow up with brush or is kept clear by hand. The growth of underbrush injures the soil and leads to the loss of falling nuts, while clearing by hand is quite expensive. The use of mowing machines would result in a great saving in the cost of labor necessary to keep the ground clear and gather the nuts. Other crops, such as Indian corn and alfalfa, can be grown between the rows of coconut trees while the latter are maturing, and used to fatten hogs, which always bring a good price in the Philippine market. The demand for copra in these islands is greatly in excess of the supply and is steadily increasing, while coconut oil now sells readily in Manila at \$1.25 Mexican per gallon.

The lands along the coast of Mindanao and Paragua are particularly favorable to coconut growing, and in the latter island trees are said to come to bearing in four years.

Mr. Lyon, the expert tropical agriculturist of the agricultural bureau, informs me that in no other country has he seen climate and soil so favorable to cacao growing as in Mindanao. The cacao now produced in that island is of superior quality and is nearly all bought up for shipment to Spain, where it brings an especially high price. There are numerous other regions in the islands where cacao can be raised to great advantage, but it is hardly too much to say that there is not to-day a cacao plantation in the archipelago, the Filipinos having almost invariably contented themselves with planting a few scattering bushes, which are left practically without care, to be swamped by brush and preyed upon by insects. Proper harvesting and curing methods are not employed. The fruits are torn from the bushes, injuring the bark and leaving the way open for the attacks of injurious insect pests.

An especially fine coffee is grown in the mountain regions of Benguet and Bontoc and in the Province of Lepanto. The bushes yield heavy crops and the unhusked coffee at present sells readily in Manila at \$35 Mexican per cavan, for consumption in these islands or for shipment to Spain. Coffee bushes come to bearing in Benguet in three years. There is no region in the United States which has a more healthful or delightful climate than is afforded by the Benguet highlands, where a white man can perform heavy field labor without excessive fatigue or injury to his health.

It is almost impossible to secure in Manila the milk needed by the sick. Fresh milk sells for 75 cents Mexican per wine quart. A dairy on the outskirts of the city, with 95 animals, including several bulls, was netting \$5,000 Mexican per month when the animals were attacked by rinderpest.

During the first eight months of 1902 there were cleared through the custom-house 14,071 head of cattle, valued at \$406,113 United States currency, and for the same period there were imported fresh meats, such as beef, mutton, and pork, to the amount of 846,901 pounds, valued at \$47,906 United States currency. At this rate we are importing into Manila fresh meat to the value of \$609,664 per annum, exclusive of that used by the Army and Navy.

Native cattle are at present worth \$30 to \$50 Mexican per head in Manila, and native grass-fed beef sells for 40 to 60 cents Mexican per pound. The pastures of Benguet, Lepanto, and Bontoc afford one vast well-watered cattle range, where there is little doubt that improved breeds of horned cattle could be successfully introduced, while in the lowlands there are vast stretches of grazing lands suitable for raising cattle and carabaos. The latter are at present worth \$150 to \$300 Mexican per head in the Manila market. Properly conducted cattle ranches will certainly yield very handsome returns.

The present cholera epidemic is believed to have been due to infected vegetables imported from China. The Chinese system of manuring growing vegetables is such as to make vegetables from that country always a source of danger to the public health, and it is important that we should have our own truck farms as soon as possible. As already stated, experience has shown that a considerable variety of vegetables can be successfully grown in the lowlands from improved American seed, and such vegetables command a ready sale at a high price in the larger cities.

Excellent native oranges are produced in the Province of Batangas, in the Calamianes Islands, and elsewhere. The trees, which are often large and vigorous, seldom receive any care, nor has any systematic effort been made to improve the quality of the fruit, which sells readily at a good price. There is every reason to believe that improved citrus fruits can be successfully introduced.

Numerous new industries, such as the raising of vanilla in the lowlands and the cultivation of fruits and vegetables peculiar to the Temperate Zone in Benguet, ought, if properly conducted, to result profitably. Communication between Benguet and Manila is at present slow and unsatisfactory. Great difficulty has been experienced in constructing a carriage road from Bagulo, the capital of the province, to Pozorubio, in the Province of Pangasinan, from which point there is a highway to Dagupan, but a good horse trail will probably be completed over the 12 miles of unfinished road within four or five months, and fairly quick communication can then be had with Manila by way of Dagupan and the railway.

AGRICULTURAL CONDITIONS IN THE PROVINCES.

Page 731. Province of Abra, Juan Villamor, provincial governor.—Principal industries of the province, cattle and timber. Principal agricultural industries, tobacco for export, rice and corn for home consumption. Eighty per cent of the carabaos and cattle killed by rinderpest. Five per cent of the land of the province under cultivation.

Recommendations.—(1) That 10,000 piculs of rice be shipped in and sold to the people at cost. (2) That 300 carabaos also be shipped in and disposed of in the same way. (3) Opening of wagon road joining Abra and Ilocos Sur. (4) Enactment of a law granting free timber licenses to the poor.

Page 735. Province of Albay, A. U. Betts, provincial governor.—Province peaceful and prosperous. Principal industry, hemp. Exports last year, 50,000 piculs; returns from same, \$12,500,000 local currency. Average price of bull carts per day, \$40 local currency. Average price of a carromata, \$25 per day. Exports of ilang-ilang, \$500,000. Exports of copra, \$300,000. Produced of sinamay, \$3,250,000. Exports of same, \$1,000,000. All hemp laborers work on shares, half and half. Seven hundred and twenty thousand dollars a year has been saved by constructing a wagon road to the coast and by adopting modern wheels on the traffic vehicles. Traction engines have been brought in to convey hemp to the coast and rice to the interior. Four hundred bicycles and numerous automobiles have also been imported. Prices of ordinary labor per day, \$1 to \$1.50, local currency. Hemp-press workers average \$2 per day. Carpenters and masons average \$2.50 per day. Longshoremen average from \$3 to \$7 per day. Beneficiador of hemp lates and two members of family average from \$8 to \$10 per day. Price of labor has risen several hundred per cent and rents have increased 300 per cent.

Page 741. Province of Ambos Camarines, James Ross, civil governor.—Peace prevails; principal product is hemp; export of hemp, 251,969 piculs; other exports are ilang-ilang and copra; planters have turned from rice production to hemp; demand for labor is greater than the supply. There is a great boom in opening up new hemp lands, with constantly increasing demands for labor, and wages steadily increasing; day near at hand when all labor will be taken up and further expansion necessarily cease. Other products of the province are rice, corn, coffee, cacao, sugar cane, cotton, cocoa, and copra. There are practically no carabaos left. Province covers 1,000 square miles and has 135 miles of road, of which 15 are in good condition, balance poor; would cost \$400,000 to repair; good roads greatly needed.

Page 749. Province of Antique, A. Salazar, provincial governor.—Population of the province 114,000; principal resource, agriculture; principal crop is rice, with which can feed whole province; average product, 1,500,000 cavanes; sugar cane formerly raised in quantities, but war and lack of work animals caused practical abandonment. Since 1901 great quantities of hemp have been planted. Other crops are copra, coffee, and cocoa. There are not 200 head of cattle left in the province, and the horses are now dying from surra. There are no passable roads in the province, and they are greatly needed. Peace and good order prevail. Despite lack of animals, fields are cultivated and the farmers always reap their just rewards.

Page 755. Province of Bataan, J. H. Goldman, provincial governor.—Main resources of province are agriculture, fishing, and timber. Principal products are rice and sugar. Two-thirds of the rice fields are planted. Twenty per cent of sugar lands are planted. The loss of acreage in both caused by lack of work animals and locusts. No want reported in this province.

Page 756. Province of Batangas, Simcon Luz, provincial governor.—Sole source of wealth is agriculture, which is completely depressed. Ninety per cent of the draft animals were lost by rinderpest. Money needed to restock province. Need agricultural loan and mortgage banks. Rice and sugar are the principal crops, together with some hemp.

Page 759. Province of Benguet, William F. Pack, provincial governor.—Best roads in province were but trails; now have 200 miles of good roads. Paid road builders 40 cents per day and up. Six hundred and ninety-two people died of cholera. New houses, new rice fields, and new coffee plantations throughout province. All pueblos in good financial condition.

Page 760. Province of Bohol, Aniceto Clarin, provincial governor.—Agriculture is prostrated on account of calamities of rinderpest, locusts, and cholera. Condition in the province precarious, but people not yet needy. Not over 30 per cent of the ordinary crops will be harvested. Need work animals; also new bridges and roads.

Page 766. Province of Bulacan, Pablo Tecson, provincial governor.—Commerce and industry beginning to flourish. Cholera, locusts, drought, and lack of work animals reported. Agriculture the sole source of wealth. Fifty to 60 per cent of animals dead. Need agricultural banks to establish agriculture. "Usurers exploit the people."

Page 769. Province of Cagayan, G. Gonzaga, provincial governor.—Province peaceful and tranquil. Rinderpest has kept up for years throughout the province. Have also suffered from smallpox, locusts, and cholera. Tobacco prices low. Recommends agricultural banks and capital.

Page 774. Province of Capiz, S. Jugo Vidal, provincial governor.—Ninety per cent of the carabaos are dead. Also suffer from cholera and surra.

Page 780. Province of Cavite, D. C. Shanks, provincial governor.—Principal crops are rice and hemp. There are many new plantations of hemp. Roads are bad; and have suffered from locusts.

Page 792. Province of Cebu, Juan Climaco, provincial governor.—Province exclusively devoted to agriculture. Much sugar, on a small scale. Tobacco crop about the same as formerly. Roads are bad; and have suffered from cholera and rinderpest. All crops except hemp and copra decreased on account of rinderpest. Sugar production fell off 75 per cent.

Page 814. Province of Ilocos Norte, Julio Agoali, provincial governor.—Have suffered from rinderpest and locusts. Roads are poor.

Page 818. Province of Ilocos Sur, M. Crisologo, provincial governor.—Agriculture looking up after war, and suffering from rinderpest. Animals are increasing. Principal products are rice, sugar, maguey, and indigo. Rice crop is fair. Sugar crop good. Maguey increasing and indigo decreasing.

Page 821. Province of Iloilo, Martin Delgado, provincial governor.—Condition critical. Suffering from rinderpest and cholera. Seven-tenths of the land is unplanted. Desires government to purchase rice and carabaos.

Page 825. Province of Isabela, Francisco Dichosa, provincial governor.—Suffered from locusts. Roads very bad.

Page 827. Province of La Laguna, Juan Cailles, provincial governor.—Roads are bad, but agriculture is prospering as never before. Have suffered from rinderpest. Cocoanuts are the principal product. Natives plant great areas. Natives make \$3 a day gathering cocoanuts, for which they receive \$1 per 1,000.

Page 829. Province of Union, J. Ortega, provincial governor.—Agriculture suffering greatly, especially rice. Production reduced 60 per cent. Causes: Cholera, drought, and scarcity of animals. Tobacco plantings small, owing to drought. No assistance asked for.

Page 833. Province of Lepanto-Bontoc, William Dinwiddie, provincial governor.—Rice is the great product. No depression reported.

Page 836. Province of Leyte, J. H. Grant, provincial governor.—Hemp is the big crop. It requires the least labor and yields greatest return. Seventy-five per cent of the carabaos are dead. No suffering. Roads and bridges bad.

Page 853. Province of Masbate, Bonifacio Serrano, provincial governor.—Cutting timber is the principal business. Large increase in planting hemp and cocoanuts. Recommends repair of roads and construction of telephone lines.

Page 856. Province of Mindoro, R. S. Offley, provincial governor.—Needs roads and telephone lines. No suffering reported.

Page 858. Province of Misamis, Manuel Corrales, provincial governor.—Nothing reported.

Page 862. Province of Nueva Ecija, Epifanio de los Santos Cristobal, provincial governor.—Agriculture prostrated by reason of rinderpest, locusts, and worms. Roads are bad. Recommends construction of telephone lines and schoolhouses.

Page 864. Province of Nueva Vizcaya, L. E. Bennett, provincial governor.—Needs roads. Agriculture is the principal occupation. Chief industry is rice. Almost impossible to hire men by day wages. When they can, they work for

natives at 20 cents Mexican per day and food; 40 cents without food to foreigners. Produce all their needs except clothing, for which they exchange rice. Clothing costs about 2 pesos a month; food, 3 pesos. Rice and tobacco principal products.

Page 871. *Province of Occidental Negros, L. Locsin Rama, provincial governor.*—Agriculture is the principal occupation. Sugar, rice, corn, tobacco, and hemp are principal products. Wages on public works, 40 cents per day Mexican. Need roads. Suffering from despotic reign of usury. Sugar and rice greatly decreased. Corn and hemp increasing. Indispensable necessity is agricultural banks to loan capital at reasonable rate. Suffering from cholera.

Page 890. *Province of Oriental Negros, Demetrio Larena, provincial governor.*—Roads are poor. Seventy per cent of carabaos lost by rinderpest. Suffered from drought. For above reasons and fall in prices of sugar and increase in laborers' wages many sugar plantations suspended work. Cultivation of hemp has maintained the province. Hemp exports greatly increasing. Hemp exports as follows:

	Piculs.
1898-----	37,000 to 40,000
1899-----	40,000 to 50,000
1900-----	50,000 to 60,000

Great enthusiasm in planting hemp. Ninety per cent of planters abandoned other crops for it. Great future for province predicted.

Page 894. *Province of Pampanga, C. Joven, provincial governor.*—Conditions more favorable than ever before.

Page 900. *Province of Pangasinan, M. Favila, provincial governor.*—Rinderpest carried away 50 per cent of stock. Suffered from locusts. Rice harvest is greater than in the preceding year. Principal products rice, cocoanuts, and salt. Roads are passable.

Page 901. *Province of Paragua, William A. Phillips, provincial governor.*—Reports that they have not had cholera.

Page 902. *Province of Rizal, A. Dancel, provincial governor.*—Have suffered from rinderpest and need carabaos. Locusts devastated fields.

Page 905. *Province of Romblon, Francisco P. Sanz, provincial governor.*—All pueblos increased planting of cocoanuts, hemp, rice, and corn. Large stores of rice on hand. Have built good wagon roads. Have suffered from cholera. Requests a steam launch and a high school.

Page 906. *Province of Samar, Julio Llorente, provincial governor.*—Principal products are rice, corn, potatoes, etc. No danger of famine. Everyone has money, owing to high price of hemp. No laborers are to be had; all work at hemp. Wages, 1½ to 2 pesos per day. One man works 2 arrobas of hemp (50 lbs.) per day, and gets one-half. Worth \$4 Mexican per arroba; thus laborers get \$4 per day. All want to work at hemp. Hemp and copra are the chief articles of commerce. Hemp exports, 164,500 piculs. Copra exports, 72,000 piculs. Roads are bad.

Page 915. *Province of Sorsogon, B. Monreal, provincial governor.*—Financial condition could not be better, although agriculture is prostrate, owing to cholera and rinderpest. "But, thank God, most of the pueblos of the province, being hemp producing, support themselves by commerce and are not in a destitute condition."

Page 921. *Province of Surigao, Prudencio Garcia, provincial governor.*—Suffered from rinderpest and cholera. Rice crop, 60 per cent of the usual crop; recommends schoolhouses.

Page 922. *Province of Tarlac, Alfonso Ramos, provincial governor.*—Much depression. Principal products cotton. Principal industries, forestry and agriculture. Herds devastated by rinderpest. Have suffered from cholera. Recommends agricultural banks, work animals, and the use of forests for agricultural purposes and dredging of rivers.

Page 925. *Province of Tayabas, H. H. Bandholtz, provincial governor.*—Have suffered from cholera. Principal product is copra; second, hemp. Ninety per cent of carabaos died. Labor very scarce. Laborers receive 50 cents a day and subsistence. Carpenters receive \$2 per day.

Page 932. *Province of Zambales, Potenciano Lesaca, provincial governor.*—Suffered from rinderpest, cholera, and locusts. Province much depressed. Principal avocation, agriculture and cattle raising. Rice principal agricultural product. Recommends carabaos and seed.

VEGETABLE GARDENING AND TRUCK FARMING IN THE PHILIPPINES.

As the result of three years' experiments on the different stations of the bureau, and from the study of data obtained from several hundred individual planters in the various parts of the archipelago, the bureau has arrived at definite conclusions as to vegetable growing and truck farming in these islands.

While our experiments have been progressing, investigations along similar lines have been undertaken by the government of the tropical French colonies of Indo-China, and it is of interest to note in their reports a general concurrence of the results obtained here. There, as here, the dry, cooler season is the time when the best general success may be expected with most exotic vegetables, and especially with those derived from far northern latitudes.

Our conclusions are derived from experiments conducted at elevations running from the sea level up to 300 meters, a range that probably covers three-quarters of the arable lands and most populous farming districts in the archipelago.

When, as will be noted further on, some vegetables are described as failures it will be understood to mean their behavior within the limits named. This will also include varieties of a yield so insufficient and quality so inferior as not to reimburse the gardener for the seed and labor invested.

At higher altitudes conditions are so modified that many vegetables flourish there which either fail or give partly negative results in the lowlands.

At great altitudes the same planting season must be observed in order to avoid the heavy summer rainfall and the frequent destruction of seeds and seedlings which occurs when summer plantings are made. Planting at the proper season makes available the high mountain plateaus of northern Luzon and central Mindanao for potatoes, onions, cauliflower, spinach, and garden peas, which, grown at sea level, at best are but qualified as failures.

The above are products peculiarly attractive to the commercial grower as they will endure long transit without serious deterioration.

As soon as reasonably cheap and rapid transportation facilities are afforded to seaport towns or interior centers of population the truck industry in those regions can hardly prove other than a remunerative enterprise.

Notwithstanding the general planting restrictions imposed, we can fortunately record a few vegetables that flourish during all seasons. Foremost among these is indisputably okra (gumbo), which never fails to respond with its abundant and wholesome fruits at all seasons and in all localities.

In successive order of suitability for planting at all times comes eggplant, pepper, radish, beans of several kinds, lettuce, endive, mustard, beets, carrots, and sweet corn.

Those succeeding in the dry cool season include, of course, the foregoing, and also embrace asparagus, tomatoes, turnips, cabbage, squash, peas, spinach, onions, parsley cucumbers, and celery as tops, and in rarely favored localities muskmelons and watermelons. Cauliflower, kohlrabi, kale, brussel sprouts, rhubarb, salsify, parsnips, leeks, chives, and French artichokes, though still the subject of investigation, have so far failed. While cool, dry-season planting is giving the best results it must, for many vegetables, be supplemented with irrigation.

It may happen (as in 1904) that the rainfall in December is sufficient to mature many vegetables, but in general that month, with a mean precipitation of only 58 mm. at Manila, must, for the west coast, be classed with the succeeding four as a dry month.

October, with a normal mean rainfall of 195.1 mm., and November, with 138.2, give assurance of the frequent gentle showers, which conduce to a good start of everything planted at that time.

With December also comes a marked decline in the temperature to a daily mean of 77.4° F. from the 83.9° that prevails in May. The contrast between the actual mean monthly minima is still more sharply defined, being only 65.3° F. for December and rising to 73° F. in May.

This analysis serves to illustrate that what we call our cool, dry season corresponds more nearly to the climatic conditions that prevail during the growing and fruiting season in countries where our best garden vegetables have originated, and that in theory, as in practice, this is the most acceptable time for planting.

For vegetables of tardy development, such as cabbage, tomatoes, onions, and most of the root crops that require three to five months to arrive at maturity, early October planting is necessary for best success.

Radishes, lettuce, squash, beans, and cucumbers, which mature their fruits in from three to six weeks from seeding, may be sown for successive crops continuously from October 1 to March 1. Peas and spinach also develop with marked rapidity, but are so sensitive to the influence of a slight increase of temperature that at sea level they may only be sown in November and December in order to fruit them in January and February, when the mean temperature is the lowest.

There are, nevertheless, many factors in vegetable growing other than climatic which call for the undivided attention of the cultivator.

There are some plants that will stoutly resist protracted heat and drought, but quickly succumb to insect pests; others, of like endurance and unsusceptible to ordinary insect attack, that will soon yield to disease. General immunity from these enemies strongly commends to the grower okra, eggplant, peppers, asparagus, radish, lettuce, endive, mustard, spinach, and carrots.

In the winter season nearly all beans (pole, Lima, and snap varieties) are more or less subject to the attack of mildew, although it must be said that they are more easily controlled by dusting with flowers of sulphur than in temperate climates.

Early (October) sown beets are generally sure to make a good crop; late sowings are mostly subject to the attack of a leaf miner. Sweet corn sown as a wet-season crop most times escapes the attacks of cutworms, but on the other hand is always exposed to the risk of lodgment during heavy storms.

Cabbages invariably are attacked by both cutworms and a true cabbage worm. These must be kept down by hand picking and frequent dusting with Paris green in the earlier stages of growth.

Given early planting, heavy manuring, irrigation, good tilth, and unremitting warfare against worms, cabbage growing at sea level may be made a profitable feature of truck growing. Pumpkins, squashes, cucumbers, water and muskmelons are subject in their early stages to the ravage of a small spotted squash beetle, and call for like vigilance in the use of Paris green.

An intelligent Japanese collaborator of the bureau in Pampanga claims to have secured entire immunity from the attacks of these beetles by sprinkling the seedlings with finely chopped wild grass. As the plants grow he renews the application every few days, covering only to an extent to prevent smothering. When the plants finally emerge from the mulch they are strong enough to resist the attack of the insect. The remedy is simple and certainly worthy of trial.

Cucumbers and all kinds of melons are extremely subject to a wilt disease that often annihilates them at the moment of greatest promise. Our experience with melons has not been promising, but a number of correspondents report excellent success on thin sandy soils that are slightly shaded with such sparse-leaved plants as the spiny acacia or the madre de cacao.

Tomatoes are an erratic crop. Excellent reports have been received from some quarters, but market gardens along the Pasig, which in 1904 produced enormous crops, were this year almost barren, and like experiences were not uncommon in other localities.

A root borer was prolific of much injury to the plantings made by the bureau, but its attacks were insufficient to explain the variability in bearing over the archipelago.

Below, in tabular form, is given a list of 24 exotic vegetables that have been cultivated in these islands, and the rating of each is given in relation to immu-

nity from disease, insects, and excess or scarcity of moisture, 100 representing the maximum of excellence:

Okra -----	100	Beets -----	70
Endive -----	90	Celery -----	70
Radish -----	90	Sweet corn -----	60
Lettuce -----	90	Tomatoes -----	60
Eggplant -----	90	Spinach -----	60
Pepper -----	90	Cabbage -----	50
Mustard -----	90	Turnips -----	40
Asparagus -----	80	Peas -----	30
Beans, pole -----	80	Onions -----	20
Carrots -----	80	Cucumber -----	20
Squash -----	80	Watermelon -----	10
Beans, bush -----	70	Muskmelon -----	10

It must be remembered that this table is based upon normal averages over many parts of the archipelago, and is not affected by the occasional report of big returns from crops numbered 12 to 18, inclusive.

It will be seen that planting in the numerical order given in the table is apt to give the grower the best all-around results.

From this it also appears that the first 7 varieties may be planted by the truck farmer with a strong assurance of profit, the next 12 with more or less chances of success, and the final 5 with but little, if any, encouragement.

To the truck grower whose garden is remote from market a slow crop maturity is sometimes advantageous, as the keeping quality of the products is increased. Quality, however, is always impaired, and the aim of the near-by grower should be to secure the tenderness so appreciated in all salad and root crops.

To this end abundant manuring, plenty of water, and frequent tillage are required. For most garden truck the soil can hardly be too heavily enriched with stable manure, and further fortified at the time of planting with ammonia salts, oil cake, or any of the substitutes that abound in nitrogen.

Before concluding, attention is invited to a few of our native vegetables which merit cultivation by truck gardeners who especially cater to the tastes of American and European consumers.

Some of these, in point of crop assurance and freedom from disease, are not only entitled to first place in our select list, but are enormously productive and subject to still further increase under good management.

Some of the native vegetables have a distinct bitter flavor, which in general does not appeal to the foreign palate. On the other hand we have:

Squash.—The dark-green native calabasa, which in sweetness and prolific bearing is unsurpassed by any foreign introduction.

Patani (a species of *phaseolus*).—Has most of the qualities of a good Lima bean, with the single drawback that the outer integument of the seed is somewhat tougher than that of the improved Lima. This, too, is quite unrivaled in productiveness, the writer knowing a single vine that supplied a family of three persons with a good mess on alternate days for a period extending over six months.

Seguidillas (or asparagus pea).—Produces an excellent and abundant pod, which, like okra, in order to be appreciated must be taken only when young and tender.

Sincamas (*pachyrrhizus*).—May be eaten raw, or, when boiled, makes a good substitute for turnips.

A number of native wild sweet potatoes, such as *Tugui* and *Nami*, when carefully prepared are not inferior to the finest yams cultivated in the southern United States.

It is quite certain that further acquaintance with these native vegetables will stimulate a demand for them, and that their culture on a commercial scale will prove remunerative.

Very respectfully,

WM. S. LYON,
Horticulturist.

The CHIEF, BUREAU OF AGRICULTURE,
Manila.

CULTIVATION AND PRODUCTION OF SUGAR AND TOBACCO.

[From hearings before the Committee on Ways and Means, House of Representatives, January 23-28 and February 3, 1906, page 267.]

FINAL STATEMENT BY HON. WILLIAM H. TAFT, SECRETARY OF WAR.

WAR DEPARTMENT,
Washington, January 31, 1905.

SIR: I venture to submit to you a summary of the reasons why, in the judgment of this Department, the bill introduced by Mr. Curtis (H. R. 17752) should pass.

First. Whatever ultimately will be done with the Philippine Islands, they are necessarily for the next generation to be a part of the United States, and the people of the United States are trustees in holding the Philippine Islands for the benefit of the people of those islands and are under a sacred obligation to treat the people of the islands as their wards. With this relation between the United States and the islands there is no more reason for a tariff against the introduction of the products of the islands into the United States than there is for a tariff on the products of Alaska, or the Hawaiian Islands, or Porto Rico, or, indeed, of New Mexico and Arizona.

Second. Under the Spanish régime the Philippine Islands were granted a differential of approximately 3 cents a pound on sugar introduced from the Philippines into Spain, and advantage of that amount of duty over the importations of sugar from all non-Spanish parts of the world.

With respect to tobacco, the Spanish Government maintained a monopoly in the manufacture and sale of tobacco, and took all of its supply from Cuba and the Philippine Islands. Since that time, as I am informed, the Spanish Government has purchased its tobacco where it could find it cheapest, and the Philippine markets have not necessarily been given the benefit of the Spanish patronage. The change of sovereignty, therefore, has taken away from the tobacco growers and manufacturers of the Philippine Islands, and the sugar growers of those islands, the monopoly of the valuable market of Spain. The United States is under an obligation to make this deficiency good. In addition to this there has been imposed a heavier tax on tobacco and sugar in Japan and in Australia, which has much reduced the opportunities for profitable sale of both products.

Third. The Congress of the United States has enacted a law by which, after the 1st of July, 1906, all merchandise from the Philippine Islands carried to the United States directly or indirectly must come in American bottoms. Unless Congress by its law shall make the markets in the United States peculiarly profitable, and shall take down all tariff obstruction to the passage of merchandise from the Philippines to the United States, this law is a most unjust law. It can not be assumed that Congress in treating the Philippine Islands for purposes of the patronage of American ships as part of the United States, and thus imposing a burden on the commerce of the Philippine Islands, will now deny the corresponding and necessary benefit of free commercial relations.

Fourth. Congress has, for the benefit of the farmers, laborers, and cordage manufacturers of this country, repealed the export tax imposed by the laws of the Philippine Islands on manila hemp exported directly from the islands to the United States, and thus reduced the revenues of the islands, which otherwise would have been raised there during the enforcement of this act, \$1,051,000 at the end of the fiscal year 1904. It should be said that in order to make up the deficit caused by this appropriation of the revenues of the islands for the

benefit of American labor and farm and business interests a provision was made by which all duties collected on imports from the Philippine Islands and paid into the Treasury of the United States should be turned over to the treasury of the Philippine Islands, but this was insufficient to meet the drain on the revenues of the Philippines, so that the net loss sustained by the insular revenues on account of the repeal of the export tax on hemp during the three years was \$329,000 at the end of the last fiscal year. Except for the fact that Congress regarded the Philippine Islands as part of the United States and felt justified, because of other benefits which it proposed to extend to those islands, in aiding particular classes of its own citizens in this country, such legislation would be unjust and improper. We are not pressing at this time a bill which shall permit all the products of the Philippine Islands to enter without the payment of any duty whatever. If we were to admit into the United States all products of the Philippine Islands free of duty, the reciprocal obligation on the part of the islands to admit merchandise from the United States free of duty would probably arise, and merchandise from the United States could not be admitted free under the treaty of Paris without extending the same privilege to merchants from Spain until the year 1909, a condition which would too seriously impair the customs revenue of the islands. By 1909, however, we hope to have an internal-revenue tax so adjusted that the loss in customs revenues on goods coming from the United States may be offset by the internal revenue.

Sixth. This House once passed a bill reducing the tariff on sugar and tobacco of the Philippines to 25 per cent. The bill passed without great opposition. There was no particular opposition because a consultation of the statistics showed that there need not be any. It was only after the opposition, which we have now seen has been nursed by paid professional agents, who have circulated unfounded statements among the trade, and have misled many persons not familiar with the facts, to enter a protest. The minute that these statements are carefully examined the portentous prophecies of enormous stimulated production of sugar and tobacco in the Philippine Islands and a destruction of the tobacco and sugar interests in the United States are seen to be only the product of timorous imaginations and to rest on no credible evidence whatever.

We are, however, now met with the decided opposition to this bill by the representatives of all the sugar and tobacco interests of this country, with the exception of a very important part of the country in the production of sugar—Hawaii and Porto Rico. The argument is that the reduction in the duty effected by this bill will so stimulate the production of sugar and tobacco in the Philippine Islands that the sugar and tobacco markets of this country will be swamped with the Philippine products, prices will be reduced, and the Louisiana cane-sugar interests, the beet-sugar interests, the leaf-tobacco growers, and the cigar makers of the country will all be disastrously affected.

With respect to these claims it is first to be observed that no one, not even an editor of the tobacco and sugar journals (and I can not state the matter any more emphatically) claims that the present production of the Philippine Islands, either in sugar or in tobacco or cigars, would have any appreciable effect if admitted into this market at the prices at which they would be admitted under the new bill. Even the lively imagination of a journalistic advocate of these interests could not rise to the point of claiming that in a market, the demand for which requires the admission of 1,800,000 tons of sugar for the yearly consumption of the people of the United States, the admission at any price of 83,000 tons of sugar, which was last year the production in the Philippine Islands, could affect in the slightest degree the market price of sugar in the markets of the United States. Nor could they claim that the introduction into the United States of the total exports of tobacco filler leaf and smoking tobacco, amounting to 19,000,000 pounds, could have the slightest effect to reduce the price of tobacco on filler leaf and smoking tobacco in the United States, where 164,000,000 pounds of filler leaf are consumed, 600,000,000 pounds of tobacco are produced, and 300,000,000 pounds thereof are exported, or that the introduction into the country of 105,000,000 cigars could influence a market consuming 7,000,000,000 cigars like that of the United States. The whole proposition of the opponents of this bill, therefore, must rest on the conjecture as to what the Philippines would be likely to produce under a reduction of the tariff from 75 per cent of the Dingley rates to 25 per cent of the Dingley rates. Now, let us consider what this reduction means in sugar, and what it means in tobacco.

Sugar.

First. No sugar is now imported into this country from the Philippines. Two or three cargoes were sent as an experiment, but they resulted in a heavy loss to their owners. They were called "cargoes in distress."

Second. This country is now using 2,700,000 tons of sugar, of which 1,200,000 tons from Cuba pays 80 per cent of the Dingley rate of duty, 600,000 tons from other foreign countries pays 100 per cent of the Dingley rates, and 900,000 tons are raised in Hawaii, Porto Rico, and the United States proper. It follows that as long as the United States demand creates the need for importation of the supply of 600,000 tons or any part of it from the rest of the world, the price of raw sugar in the markets of the United States will be regulated by the price at which foreign sugars can be sold after paying the full Dingley rates, and that after such foreign importation shall cease the price of raw sugar in the United States will be regulated by the price at which Cuban sugar can be delivered in the United States after paying 80 per cent duty. It follows that no supply to the markets of the United States at any cost and at any duty, however low, from the Philippines, will or can affect the price of raw sugar in the United States until both foreign and Cuban importations cease.

If the price of sugar in the markets of the United States is not affected by Philippine importations, then the domestic producers are not in the slightest degree affected to their prejudice. It follows, therefore, that until the domestic production of sugar and the Philippine importation combined shall increase the supply of the United States by more than 1,800,000 tons the price will not be affected either by the Philippine or the domestic production. As the growth in the United States demand for sugar from year to year is considerably greater than the increase in domestic production of sugar, it follows necessarily that the Philippine importation into the United States must increase from nothing, as it now is, to 1,800,000 tons to sustain the contention of the opposition.

Third. The only motive which the present bill will furnish for the increase in the present production of sugar in the Philippine Islands so as to lead to an importation from the Philippines into the United States of 1,800,000 tons is the reduction in the duty from 75 per cent of the Dingley tariff on sugar to 25 per cent of that tariff. The 75 per cent tariff on sugar that polarizes even higher than the sugar usually imported from the Philippines is eighty-eight one-hundredths of a cent a pound. Twenty-five per cent of the Dingley rate on same sugar is twenty-nine one-hundredths of a cent. In other words, this bill under discussion proposes a reduction in duty of fifty-nine hundredths of a cent a pound on Philippine sugar. It is then for the opponents of this bill to establish that if Philippine sugar could be laid down in New York fifty-nine one-hundredths of a cent less a pound than now, at least 1,800,000 tons of Philippine sugar would come into this market and displace the foreign and Cuban sugars and stop their importation.

Fourth. This is impossible. For the last four years the importation of Philippine sugars to all countries has not averaged 100,000 tons, and last year it did not exceed 84,000 tons. Willett & Gray, sugar-trade publishers, predict that this year the exportations will reach 140,000 tons, but this is wholly conjectural and probably erroneous, because Mr. Colton, the collector of customs at Iloilo, the sugar port of the islands, says the exportation this year will show a falling off, and probably not exceed 65,000 tons. But 140,000 tons admittedly will have no effect on this market. The greatest amount ever exported from the islands, and that was at a time when sugar was at a much higher price, was 264,000 tons in 1893. The price of sugar in Iloilo to-day is \$3.50 a picul of 137½ pounds (see Governor Wright's telegram), or 2.54 cents a pound laid down in New York; the freight is 0.24 cent and the insurance is 0.08 cent, or a total of 2.86 cents; add present duty of 0.88 cent makes a total of 3.74 cents.

The proposition of the opponents of the bill is that if this cost of laying down in New York was 3.15 cents, or about 19 per cent less than at present, which would be the effect of the present bill, the importation from the Philippines, which is now nothing, would increase to 1,800,000 tons, and the total production of the island, which is now less than 100,000 tons, would increase to at least 1,800,000 tons, or 1,700 per cent.

Fifth. This is absurd on the face of it. Much is made of the low cost of producing sugar in the Philippines. The best evidence, that of Señor Luzuriaga, of Negros, a large sugar planter, one of the foremost Filipinos of to-day, a clear-headed business man, testifying in another issue than the one before us, says (see Phil. Com. Report, 1903, vol. 1, pp. 182-184; see appendix hereto)

that to-day in the Philippines the immediate outlay in the planting and cutting of cane, the preparing of the sugar, and laying it down at Iloilo is 1.25 cents a pound, this without including anything for depreciation in plant, any profit, any interest on loans, or any rent for the land. Add to this 0.24 cent freight to New York, 0.08 insurance, and 0.88 cent duty, and the cost, without profit or interest or rent or allowance for depreciation of plant, or laying it down in New York, under the present tariff, is 2.45 cents, and yet not a ton comes here, though the price in New York ranges from 3.38 cents to nearly 4 cents a pound. This, of course, shows that reckoning in profit and other charges needed to induce the production and importation, the price at which the sugar can be laid down in New York is in excess of 3.38 cents, and the claim that the cost of production is less than 1 cent is wholly unfounded. Rent must be a substantial element in the cost, because first-class sugar land is worth in the islands from \$20 to \$40 an acre (see evidence as to Friars' land in Phil. Com. Report, 1903, appendix to civil governor's report; see appendix hereto). Interest on agricultural loans in the Philippines ranges from 20 to 35 per cent annually.

Sixth. The opponents of the bill say that there are 50,000,000 acres in the Philippines available for sugar planting that will at once be turned into sugar land with modern machinery, and that it will produce 5 tons an acre. This is "moonshine." The best evidence shows that good sugar land to-day does not average in five years to exceed 1.2 tons of sugar a year, and that with the best and most expensive machinery and methods the best land would not produce more than Cuban lands produce, or 2½ tons to the acre. The acres under cultivation in the islands to-day do not exceed 200,000, if they reach that figure, and probably never in the history of the islands, under the spur of three times the present price of sugar, have the acres of sugar land ever exceeded 400,000. Sugar is raised at a profit for export in three or four provinces, Occidental Negros, Pampanga, Iloilo, and Cebu. It is raised in all the provinces, as it is everywhere in the Tropics, but merely for local consumption and food. In Occidental Negros a large part of the surface is mountainous and unfitted for sugar, and the south one-third is impenetrable forest, impossible to clear in many years. Pampanga has much swamp land in it unsuitable for sugar. The truth is that hemp, copra, and even rice, are more profitable crops and involve much less outlay than sugar, even with the proposed improvement under the present bill. Hemp forms 65 per cent of the exports of the islands, and copra is next. It is the height of absurdity to suppose that even free trade in sugar with the United States would mean more than a merely gradual growth in sugar land and sugar production in the Philippines.

Seventh. The most serious limitation upon the production of sugar and its increase is the limited supply of labor and the necessarily rapid increase in the cost of labor if there is any considerable increase in sugar raising. To-day, even with the small crop, sugar planters have to bring to Negros from the distant island of Bohol, from Antique, and from Capiz one-half their labor supply for the cutting season. The increase in the hemp production increased the price of labor in the hemp fields from 50 centavos to 2, 3, 4, 5, and 6 pesos a day for an adult, and if sugar were to double in product as hemp has, we may expect a similar increase in the cost of sugar labor. It needs no argument to show how impossible under such a restriction an increase in production of 500 per cent is, let alone one of 1,700.

Eighth. Much is made of the investment of American capital in sugar and sugar machinery. In the first place, no corporation can take up or hold more than 2,500 acres of land. This is prohibitory, so far as new investment in sugar plantations is concerned, because the sugar cane produced from such a tract would not justify the investment of the amount needed for a modern sugar plant. A plant necessary for the turning out of 15,000 tons of sugar annually costs \$1,000,000. To produce 500,000 tons of sugar in the Philippines there must be an investment of \$33,000,000 in plant alone, and to produce 1,700,000 tons it would require, more than \$110,000,000, and this does not include the heavy cost of preparing land for cane, which would certainly be \$15,000,000 more. Is such an investment to be induced by the prospect of a reduction by this bill of the cost of laying sugar down in the American market at 19 per cent less than it can now be laid down there, when now it can only be laid down in New York at a loss?

Ninth. The sugar of the Philippines would never all of it come to the United States. The natural market for sugar is China. The demand for Philippine sugar in that market is growing. China takes in a mass the "sorted" sugars

produced in the Philippines, which embrace four grades—one polarizing at 88°, one at 85½°, one at 80°, and the fourth or wet sugar at 70°. When this sugar comes to the United States it must be graded. If any substantial part of the Philippine sugars were diverted to the American market, the Chinese market would have to go elsewhere and at greater cost for its sugar. Hence China would bid against America just as it does to-day, and the market price of sugar at Iloilo for export to China would probably be what it is to-day, to wit (see evidence of Mr. Willett, of Willett & Gray), the New York price less the cost of freight, insurance, and duty. Certainly the crop of the Philippines would then be divided between the United States and China.

Tobacco.

First. No tobacco of any kind is exported commercially from the Philippine Islands to the United States. No tobacco is raised in the Philippines except leaf adapted either for wrappers or fillers or for smoking tobacco. Six hundred million pounds of tobacco is raised in the United States, of which 300,000,000 is exported. One hundred and sixty-four million pounds of leaf for cigars is consumed in the United States. Not more than 50,000,000 pounds of tobacco is produced in the Philippines, and of this but 19,000,000 pounds is exported. Of these exports a very small amount, say 10 per cent, is wrapper leaf, and the remainder is filler leaf and smoking tobacco. The price for wrapper leaf in Manila per pound is 30 cents. (See Governor Wright's cable.) The duty per pound at 25 per cent of the Dingley rate would be 46 cents, making the cost in New York, without freight or insurance, of 76 cents a pound, a price considerably greater than Connecticut wrapper leaf, which is better leaf than the Philippine wrapper leaf. The price for filler leaf in Manila is 10 cents a pound. (See Governor Wright's cable.) The duty per pound at 25 per cent of the Dingley rate would be 8 cents a pound, or the filler tobacco from the Philippines of the best quality would be 18 cents a pound in New York without freight or insurance, a price several cents higher than filler from Ohio or Pennsylvania or other States. In other words, there is not the slightest danger of wrapper or filler tobacco from the Philippines competing with American filler leaf.

Second. The duty on cigars at 25 per cent of the Dingley rate is \$1.125 a pound and 6½ per cent ad valorem. The "perfecto" cigar made in this country of Sumatra wrapper and Cuban filler by Cuban hand work sells at \$120 a thousand, and of this \$34 is labor. The same cigar made in this country of Sumatra wrapper and Cuban filler by American hand work is worth \$70 a thousand, and the labor is \$17 a thousand. The Philippine "perfecto" laid down in New York is worth about \$46, and the labor is \$6. The Philippine cigar, of course, can not compete with the Cuban cigar and is not in the same class any more than American-made Cuban cigars are in the same class as Cuban-made Cuban cigars. But what is very evident is that by reason of a duty of \$1.12½ a pound on the Philippine cigars and 6½ per cent ad valorem it would be possible for American cigar makers to make cigars out of Philippine tobacco at \$17 a thousand of 17 pounds and undersell cigars of the same material made in Manila, and this is true of all the kinds of cigars, "perfectos," "high life," "panatela," or "londres" likely to be imported from the Philippines into this country.

Third. The Philippines only export 105,000,000 cigars to all countries, whereas America alone manufactures 7,000,000,000 cigars. The suggestion that the export from the Philippines could seriously affect the American market is absurd.

Fourth. The tobacco land of the Philippines for export is confined to Isabela, Cagayan, Ilocos Norte, Ilocos Sur, Abra, and Union. Tobacco raised elsewhere is for local consumption only. The two first-named provinces are the important ones. They are sparsely settled, and the labor supply there is very poor. The culture of tobacco is not in the hands of large landowners, but of small farmers, whose care of the plants is not what it should be. (See Governor Gonzaga's report of the tobacco industry.) There is very little hope of great expansion by increase of price, because of lack of labor. The prophecy that cooler labor will be introduced from China is wholly unfounded. The policy of exclusion of the Chinese from the Philippines is the policy of the United States Government, of the Philippine Government, and most important of all, of the Philippine people.

For the considerations above stated I earnestly urge this honorable committee to report favorably the bill under discussion, reducing the duty on sugar and tobacco to 25 per cent of the Dingley tariff. I sincerely hope that the committee

will not be led, in a spirit of compromise, to a reduction to merely 50 per cent of the Dingley rates. I am confident that a 50 per cent rate would not do the islands the slightest good or result in any appreciable importation of either tobacco or sugar into this market. At one time I hoped it might, but our experience with a reduction of 25 per cent satisfies me that I was mistaken. The only possible good that a 50 per cent rate would do would be to show how ridiculous are the claims of the beet-sugar and tobacco men who have appeared before you as opponents of this bill, and thus to lead you slowly on to tardy justice to the Philippine Islands.

I hope, moreover, that the committee will not be led to hesitate to vote right on this bill and on the showing made here because of a fear or belief that it may not pass the House or Senate for shortness of time. I plead for justice for the Philippines before this leading committee of the House of Representatives and ask a decision on the merits of this bill without regard to the future fate of this particular bill, because your just judgment will be of the greatest weight in every one of the future discussions of the issues presented, to which I propose, as long as through official channels I may properly do so, to invite the continued attention of Congress.

* * * * *

Very sincerely, yours,

WM. H. TAFT,
Secretary of War.

HON. SERENO E. PAYNE,
*Chairman Committee on Ways and Means,
House of Representatives.*

Inclosures.

[From Fourth Annual Report of the Philippine Commission, 1903.]

Testimony taken at Malacañan Palace February 16, 1903, relative to the value of lands owned by the religious orders.

Governor TAFT. Is all this land rice land?

Señor VILLEGAS. No, sir; other crops are grown, such as sugar.

Governor TAFT. How much ought first-class sugar land to produce?

Señor VILLEGAS. From 25 to 30 pilons of sugar to a hectare.

Governor TAFT. How much does second-class sugar land produce?

Señor VILLEGAS. From 16 to 20 pilons.

Archbishop GUIDI. Explain to me why you have valued rice land above sugar-cane land, when it is known that the latter gives a more valuable product.

Señor VILLEGAS. It is because they are higher lands than those of palay.

Archbishop GUIDI. Is it not true that the sugar-cane land gives a greater profit than rice land?

Señor VILLEGAS. No, sir; rice lands give a more valuable crop than sugar.

Governor TAFT. Are the expenses of cultivating sugar greater than the expenses of cultivating rice?

Señor VILLEGAS. Yes, sir.

Governor TAFT. How do they differ; how much?

Señor VILLEGAS. It is slight, but the difference consists in the using of machinery with sugar cane.

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TESTIMONY OF SEÑOR JOSÉ LUZURIAGA, MEMBER OF PHILIPPINE COMMISSION.

Governor TAFT. Señor Luzuriaga, you are a member of the Philippine Commission?

Señor LUZURIAGA. Yes, sir.

Governor TAFT. You are a citizen of the province of Occidental Negros?

Señor LUZURIAGA. Yes, sir; of Bacolod, the capital.

Governor TAFT. You have lived in Occidental Negros, as I understand it, all your life?

Señor LUZURIAGA. Yes, sir.

Governor TAFT. Do you own land in Negros?

Señor LUZURIAGA. Yes, sir; I am the owner of three estates which are devoted principally to the cultivation of sugar cane and also rice.

Governor TAFT. Are you familiar with the prices of sugar land per hectare in Occidental Negros?

Señor LUZURIAGA. Yes, sir; I can testify on that matter.

Governor TAFT. How far from the sugar market is land in Negros?

Señor LUZURIAGA. The local markets for the sugar grown on the estates in Occidental Negros are situated on the coast of that province. They are Silay, Saravia, Bacolod, Talisay, San Enrique, Bago, and Pontevedra, and, on the southern coast, Ilog, all of which are maritime ports; but from these local markets the sugar is shipped to the central market, which is situated in the town of Iloilo.

Governor TAFT. Is it the habit of the vessels which carry the sugar to beach—come right up on the shore—and take the sugar from the estate directly to Iloilo?

Señor LUZURIAGA. In some cases the lorchas are able to come right up to the estate, but as a general rule the sugar is shipped from the coast itself, where the boats come right up to the coast and are loaded there and take the sugar to Iloilo.

Governor TAFT. How much is the ordinary gross product from a hectare of first-class sugar land?

Señor LUZURIAGA. That depends on the class of lands. Sugar lands are classified into first, second, and third class lands. The product of first-class lands—that is, of the superior lands—is 80 piculs per hectare. But it must be borne in mind that that is the product of a good year. It will not produce that in ordinary years.

Governor TAFT. I would like to ask you generally as to the classification of land. Do they classify land according to the production in the good years, when the conditions are all favorable, or according to the average through favorable and unfavorable years?

Señor LUZURIAGA. As a general rule the classification is made on the basis of five years. It is calculated that in those five years one crop will be an extraordinarily good crop, two years will be ordinary crops, and two years bad crops.

Governor TAFT. When you say first-class land will produce 80 piculs a year, do you mean in a good year?

Señor LUZURIAGA. Yes; I mean in a good year. The two years of average crops would produce about 60 piculs of sugar, and the two bad years I calculate would produce about 25 piculs; that is, on an average.

Archbishop GUIDI. Is it the custom to renew the seeding of the sugar cane every year?

Señor LUZURIAGA. In my estates I have always been accustomed to do so, but in certain parts of Negros, around Isabela, for instance, they do not renew the stalks for three years.

Archbishop GUIDI. Is this land not worth a great deal more?

Señor LUZURIAGA. It was owing to the fact that it was not so expensive to cultivate.

Governor TAFT. How much is sugar land worth to-day that produces 80 piculs in a good year?

Señor LUZURIAGA. That also depends on the quality of the sugar. There are four classes of sugar raised in the island of Negros—first, second, and third class, and the common or ordinary. At the present time they are getting an extraordinarily good price for the sugar. No. 1 sugar is worth in Iloilo as much as \$6 a picul. There is a difference of 3 reals between No. 1 and No. 2 sugar, and from No. 2 to No. 3 of 2 reals.

Archbishop GUIDI. I understood you to say that this was an abnormal price paid this year, but from my understanding of the matter, which I have based upon a reading of the newspapers, the reduction of the Dingley tariff will have such an effect on the Philippines with regard to sugar culture that the price of sugar will go still higher.

Señor LUZURIAGA. The opening of the United States market is only one factor in the situation. The price is governed more by supply and demand; it depends altogether on the production of beet sugar in the United States and other places, and the production of cane sugar in Java, Cuba, and other countries.

Archbishop GUIDI. The sugar planters of the Philippines would have this advantage, that they could export their sugar to the United States market without paying any duties, and it would undoubtedly have the effect of raising the value of sugar land in the Philippines.

Governor TAFT. I want to speed the day when sugar can go from these islands into the United States, but the difficulty is that Congress has adjourned without

passing such a law, and the reduction of 25 per cent on the Dingley law has made no appreciable difference. The prospect of further reducing the Dingley tariff 50 per cent, so the merchants informed me the other day, had the effect of increasing the price of sugar, but with the failure to reduce the tariff the price of sugar, I presume, has fallen.

Archbishop GUIDI. But the fact that Congress has not denied that reduction in the tariff, but simply postponed action upon it, gives me to understand that there is a probability that Congress will in the future grant this reduction. At any rate, it is more reasonable to believe that the reduction will be granted than that it will not be granted.

Governor TAFT. I sincerely concur in that. I believe that Congress will do it at the next session. I shall be very much disappointed if it does not reduce the duties on sugar and tobacco from the Philippines. But this is a little aside from the discussion. I wanted to get at the price of land in the Philippines at the present high price of sugar.

Archbishop GUIDI. The point I wish to make is this: Señor Luzuriaga has said that this was an abnormal and extraordinary price for sugar this year. This extraordinary and abnormal price will in the future be an ordinary price.

Governor TAFT. What is the difference between the price of sugar in Negros and the price in Iloilo?

Señor LUZURIAGA. Fifty cents.

Governor TAFT. So that the price is \$5.50 a picul on the land where it is produced?

Señor LUZURIAGA. That was the price in the months of January and February, but now it has lowered a little. At present we can get only \$4.60 for No. 1 sugar on the hacienda.

Governor TAFT. Let us take it in round figures, \$5 a picul in Negros. Would that mean a hectare would produce 400 pesos a hectare value of the gross product?

Señor LUZURIAGA. Yes, sir.

Governor TAFT. What is that land which makes a gross product of 400 pesos a year in good years worth, as land is sold in Negros, per hectare?

Señor LUZURIAGA. Owing to a very special condition of things down there, that land which produces 400 pesos a year per hectare is to-day worth not one-half of that sum. That is due to the special circumstances down there and the lack of money. It simply involves the principle of supply and demand.

Governor TAFT. Do you know whether there is any greater lack of money in Cavite than in Negros?

Señor LUZURIAGA. I understand there is a great scarcity of money in Cavite Province, so much so that I have been given to understand that one-half of the inhabitants there are engaged in robbing the other half. The lack of money is very much felt in Occidental Negros, and it has had this effect on sugar cultivation, that one-fifth of the land is now devoted to sugar culture that has been devoted two years before.

Archbishop GUIDI. I take it that the present conditions that prevail in the islands are altogether abnormal, and I do not think we can base any argument on these abnormal conditions, because there may be a change any day. Perhaps to-morrow things may regulate themselves, and it is impossible to make any calculations on such an abnormal situation.

Señor LUZURIAGA. The trouble is that we have been living under these abnormal conditions four or five years and we are within them yet.

Governor TAFT. What, as rule, is the price of first-class land in Negros to-day, per hectare?

Señor LUZURIAGA. As a rule, from 100 to 150 Mexican pesos per hectare for first-class land.

Archbishop GUIDI. If these are the prices paid in these abnormal times, what was the land worth during normal times?

Señor LUZURIAGA. About 100 pesos.

Archbishop GUIDI. Do you refer to the land here? Several witnesses have testified that the land was worth 200 pesos.

Señor LUZURIAGA. My remarks applied to the island of Negros. I know a great many estates that are now advertised for sale in Negros. They are simply given away almost.

Governor TAFT. Are there some sold there? Do you judge from the prices actually brought?

Señor LUZURIAGA. Yes, sir.

Governor TAFT. Is your estimate based on that?

Señor LUZURIAGA. Yes, sir; you can search the records down there and find my statements to be based on sales actually made.

Governor TAFT. And I understand that for the purposes of growing sugar Negros is just as convenient to the sugar market as Cavite—or is that so?

Señor LUZURIAGA. Yes, sir; that is true with regard to the markets, and I doubt whether there are any lands in Cavite that are as fertile and as good for sugar cultivation as in Negros.

Governor TAFT. How is it with reference to Pampanga?

Señor LUZURIAGA. In Pampanga there are no lands that are equal in fertility or in productivity to those in Negros. I have seen some of the land in Pampanga.

Governor TAFT. Is Iloilo as convenient to Negros as Manila to Pampanga?

Señor LUZURIAGA. Yes, sir; the market of Iloilo is only about three hours away.

Governor TAFT. Is the expenses of raising sugar, in proportion to the value of the product, greater or less than that of raising rice?

Señor LUZURIAGA. Proportionately, the expense of cultivating sugar cane is much greater than cultivating palay.

Governor TAFT. What is the comparative expense of the two?

Señor LUZURIAGA. In good times in Negros we could produce 1 picul of sugar at an expense of 3 pesos, Mexican. Now the expenses are very much greater, owing to the fact that the locusts have appeared down there, the cattle have all died, and the cultivation has to be done entirely by hand. The price of labor has also risen.

Governor TAFT. What do you calculate it is now?

Señor LUZURIAGA. All expenses could be covered, I think, approximately, by 4 pesos; that is, including all expenses of placing it in the market.

* * * * *

SUGAR.

[From census of the Philippine Islands, 1903, v. 4, p. 25.]

SUGAR.

For many years prior to 1887 sugar was the most important commercial product of the Philippines. Since that year, except in 1893, it has ranked second in importance to hemp, the value of its exports not having been exceeded by those of any other commodity, except in 1898, during the five months for which figures are obtainable, tobacco exports were considerably larger, the sugar being only 7.6, while the tobacco was 27.9 per cent of the value of all exports; in 1901 it was exceeded by tobacco by less than one-half of 1 per cent, its percentage of total exports having been 10.4. Its average percentage of all the years for which statistics are given was 34.9.

The quantity of sugar produced annually prior to American occupation was much larger than it has been since. In 1881 over 460,000,000 pounds (208,805,946 kilograms) were exported, and in 1895 the quantity had risen to over 750,000,000 pounds (341,469,556 kilograms); but in 1899, the year immediately following American occupation, the quantity exported was not quite 190,000,000 pounds, which quantity was not again equaled until 1902, when it reached 217,000,000 pounds.

Sugar culture.

[By Hon. José R. de Luzurlaga, Philippine Commission.]

According to a version accepted in some districts of Luzon and the Visayan Islands, the introduction of the sugar cane into the Philippines is attributed to Chinese immigrants who probably brought it from the island of Formosa, although opinions differ in regard to this particular; it being also said that the purple cane of the Visayan group was brought from Batavia, and that the kind cultivated in Luzon came from Tahiti, the presumption being in the latter case that its introduction was due to the Spanish Government which, at that time, ruled in these Islands.

The similarity, however, of the method of cultivation followed here to that in Formosa, when that island formed an integral part of the Chinese Empire, and the fact that in spite of the length of time which has transpired, some Chinese names of certain implements and manufactures used in sugar making in many communities of Luzon and the Visayan group are yet current, suggest that the Chinese must have played some part in the introduction of the sugar industry to these Islands, and yet it is not possible to vouch for the exactness of this presumption because of the lack of historical data from a reliable source which would place it in the realm of certainty.

Of the many known species of sugar cane, but six occur at the present time in these Islands—the purple, white, red, green, striped, and the black with white rings at the joints. The first named is the most generally cultivated in the Visayan Islands on account of its acknowledged superior properties and the advantages it possesses over all the others mentioned from an agronomic, industrial, and economic standpoint. The white cane, and the green as well, have been grown on a small scale in the group referred to, their cultivation being restricted almost exclusively to some provinces of Luzon and the rural districts near Manila, where a taste for the juice of the cane extracted by chewing the stalk is responsible for a considerable consumption of these species. The striped variety is cultivated in very small quantities, a few specimens occasionally being found mixed in with plantations of the purple, and, lastly, the black is wont to be found in rare instances in a few gardens in isolated clumps near the house, it being raised more as a botanical curiosity than for

any other purpose, as this variety grows slowly and requires great care for its tardy development, although at maturity it is of extraordinary size with a stalk 2 inches in diameter and from 24 to 30 feet in height. Its juice, which is used as an agreeable or medicinal beverage, is extracted by making an incision in the lower part of the stalk and allowing the sap to drain into a receptacle.

In the Philippines the cane is planted, as a general thing, in high, level ground, sufficiently moist and well worked and prepared. In most plantations the cane is put in during November, December, and January, the same months in which the grinding takes place. In alluvial soils, such as are found in some parts of the island of Negros, planting takes place but once every five, six, seven, or even up to ten years, though the same crops are gathered annually, providing care is taken after the cane is harvested not to injure the stalk, which is allowed to remain in the ground, and in the proper cultivation of the sprouts or shoots newly put forth by it. The plantation must then be worked and the soil must be sufficiently broken up and kept clean of weeds during the first ensuing six months, or until the same is thickly sown.

Cane must be allowed to grow for twelve, thirteen, or fourteen months, according to the soil in which it is planted. On virgin or newly cleared land the period is eighteen months, after which time it must be gathered without delay if it is desired to avoid detriment to the crop.

Philippine sugar is of two kinds, classified according to manufacture and packing—that made in pilones (which includes nearly all from Luzon), and the granulated, which is the kind that has been adopted in the Visayan Islands and in some Luzon plantations.

The pilon is a quantity of sugar generally solidified in a receptacle made of baked clay, which serves as a package, having the form of an inverted cone; it weighs one quintal. The granulated is put up in sacks, or what are known as bayones, made from the leaves of a palm called buri, containing from two and a half to five arrobas of sugar, according to the place from which it comes. The bayon is reinforced by a covering of rattan, the entire package being as marketable as is the pilon, although the latter is practicable so far only as Manila is concerned, while the use of the former package is more general, as it is employed with reference to all sugar exported to the markets of foreign lands.

Sugar manufactured in pilones is, by reason of its quality, classified as first, second, and third grade, while the granulated has a different classification, which is, superior No. 1, No. 2, and No. 3, good current and ordinary current. Superior No. 1 corresponds to Dutch No. 16 and generally contains from 93° to 97° polarization.

Further, the classifying term "assorted sugar" is frequently used in contracts. This applies to a quantity of sugar of superior quality made up of three classes or numbers in the quantitative proportion commonly established by the market.

Except in a very few cases, sugar is generally sold as the crop is being gathered. In addition to sales made by planters in the producing districts, a large part of their sugar is placed in the hands of jobbers, who sell it at a higher price in the markets of Manila, Cebu, and Iloilo, ports that are open to general commerce and, as such, having each a custom-house. At each of these places there are firms engaged in the business of buying and exporting sugar, and they fix the price of that article based on the law of supply and demand as shown by market quotations received from the principal commercial centers of the world. The best prices are paid in Manila, Iloilo, and Cebu, but a large number of planters are obliged to yield to temporary financial distress and sell their product to jobbers on the plantations at a price always detrimental to their best interests.

During a period covering many years, cultivation of the sugar cane remained stationary and was conducted on a very small scale. This was due, in the first place, to the inexperience of most planters who were able to produce sugar only of the current class and of inferior quality; second, to the inferiority of the implements used in the cultivation of the cane and manufacture of the sugar; third, to the defective methods of transportation, which impeded when they did not entirely prevent the flow of trade; and, last, to the lack of freedom and immunities that would help business transactions in the provinces, for which reasons Philippine sugar could not prosper at that time in the markets of the world.

However, in 1855 and the following year, during the Crimean war, which involved England, France, and Russia, there was a rise in the price of sugar,

which reached \$13 and \$11, respectively, for a picul of 137½ Spanish pounds. Owing to this incentive the cultivation of cane increased in the provinces of Pampanga, Batangas, and Cavite, in Luzon, and in Cebu, Iloilo, and the island of Negros, in the Visayan group, and at the same time was extended to other provinces, so that in a few years, with the help rendered by the opening of some ports to international commerce, such as Iloilo and Cebu, sugar production in the islands increased fivefold, particularly that of the island of Negros, where it appeared that persons of all classes and conditions had agreed to devote their best energies to the then arduous work of cultivating those lands, the majority of which were heavily covered with timber, there being but a few clearings in the forests where the plow had been used. These pioneer planters were unprovided with sufficient funds, and were exposed to the dangers of swamp fevers and other diseases of like character, which, during the operations of clearing and the first plowing of the land, caused considerable loss of life among their number. But these difficulties were not great enough to discourage them. They had great faith in the future, in view of the valuable assistance lent them by two commercial firms of Iloilo. One of these was the English house of Loney & Co. and the other the American firm of Russell & Sturgis, both of which advanced them money for operating expenses and the purchase of machinery. The advances made were returnable in sugar. Other circumstances that contributed in no small measure to the success of these pioneer planters were cheap labor, an abundance of cattle suitable for plantation work, and the absolute security enjoyed by everyone in the island of Negros at that time as regards person and property.

Under such favorable auspices production naturally increased rapidly, so that the 6,000 tons produced in 1855 were increased to 30,000 in 1860, to 100,000 in 1870, to 180,000 in 1880, and 300,000 in 1893—the largest known production in the Philippines—distributed among the different provinces as follows:

Crop of the year 1893.

Province.	Piculs of sugar.	Province.	Piculs of sugar.
Island of Negros.....	2,000,000	Bataan.....	30,000
Pampanga and Tarlac.....	700,000	La Laguna.....	30,000
Batangas.....	650,000	Bohol.....	20,000
Iloilo and Concepcion.....	600,000	Tayabas.....	20,000
Cebu.....	300,000	Ilocos Norte.....	20,000
Cavite.....	180,000	Ilocos Sur.....	10,000
Capiz.....	100,000	Nueva Ecija.....	10,000
Antique.....	80,000		
Pangasinan.....	50,000	Total.....	4,800,000

The following tables, taken from the annual report of the Manila chamber of commerce, compiled by a committee of the same in December, 1901, complete the statistics given for the purpose of demonstrating the importance of the production of sugar in the Philippines:

Exports of sugar from Philippine ports: 1891 to 1901.

[Piculs.]

	1891.	1892.	1893.	1894.	1895.	1896.
Manila City.....	1,174,374	1,089,064	1,712,064	1,577,523	1,729,665	1,563,277
Cebu.....	140,200	294,220	271,405	163,172	213,352	123,228
Iloilo.....	1,357,685	2,571,969	2,203,523	1,369,507	1,754,315	1,984,519
Total.....	2,672,259	3,955,253	4,186,982	3,110,202	3,697,332	3,671,024

	1897.	1898.	1899.	1900.	1901.
Manila City.....	918,114	251,169	80,874	404,813	68,523
Cebu.....	247,110	159,469	210,780	51,936	126,604
Iloilo.....	2,066,786	2,249,023	1,197,700	540,078	691,261
Total.....	3,232,010	2,659,661	1,488,854	996,827	886,388

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Exports of sugar to different countries: 1891 to 1901.

[Piculs.]

	1891.	1892.	1893.	1894.	1895.	1896.
Great Britain.....	731,507	1,181,392	1,577,155	978,719	1,373,433	901,256
United States and Canada.....	1,604,072	1,506,872	1,291,421	910,155	1,056,237	1,305,828
Continent of Europe.....	37,394	48,512	69,493	68,666	63,149	55,946
China and Japan.....	299,286	1,219,487	1,248,913	1,132,662	1,205,513	1,407,994
Total.....	2,672,259	3,955,263	4,186,982	3,110,202	3,697,332	3,671,024

	1897.	1898.	1899.	1900.	1901.
Great Britain.....	799,548	675,670	132,792	203,970	-----
United States and Canada.....	342,540	520,752	353,680	33,600	81,600
Continent of Europe.....	28,862	2,887	164,033	-----	-----
China and Japan.....	2,061,060	1,660,352	838,349	759,257	804,788
Total.....	3,232,010	2,859,661	1,488,854	996,827	886,388

As may be seen from the above statistics, exports of sugar from the Philippines reached 4,186,982 piculs in 1893, equivalent to 261,686 tons. If to this be added the amount used for domestic consumption, including that refined at Malabon and Manila, and that used by distilleries in the capital city and the provinces which use current grades of sugar in the making of spirits, we will have a total production of 300,000 tons.

After the period of progress in the cultivation of the sugar cane in the Philippines, which, as has been seen, reached its greatest development in the year 1893, had passed, a decline set in from the year following that mentioned, which continued until 1895, when there was a favorable reaction lasting two seasons. In 1897 the depression set in, from which it has been unable to recover up to the present day. This depression is due to the vicissitudes agriculture has experienced in this country during the past few years, caused first, by the competition of beet sugar in the great centers of consumption; second, by the growth of hemp and cocoanut plantations, which have taken away a considerable number of laborers from sugar estates; third, to the continual fluctuations in the price of sugar brought about by the financial crisis and the rate of exchange that resulted in the failure of many planters; and last, to the war, the rinderpest, the cholera, miasmatic fevers, famine, and the locusts, which brought ruin to many plantations and caused a complete depression in the cultivation of the cane in nearly all of the sugar-producing provinces, the exceptions being Negros Occidental and Negros Oriental, Iloilo, Cebu, Pampanga, Batangas, and La Laguna, where work has been carried on under great difficulty.

Last season's crop has been estimated at some 2,000,000 piculs for the entire archipelago, of which 1,500,000 piculs were produced by Negros Occidental, and the balance by all of the other provinces mentioned. Thanks to extraordinary efforts and at the cost of great sacrifices at the beginning of the present year, good and extensive plantations of cane were made in Negros Occidental, which gave promise of a yield still greater than that of last season, but considering the ravages made of late by the locusts, in spite of the efforts of the Government to exterminate them, it is impossible to estimate at present the amount of next season's crop.

The sugar industry in these islands is considered as the most costly among all those derived from the Philippine soil. To-day it is not possible to consider the establishment of a plantation—commonly called hacienda in this country—without going to great expense in the purchase of land, work cattle, and agricultural implements, and the construction of buildings, installation of the machinery plant, repair shops, and the providing of means of transportation, as well as all other accessories necessary for an undertaking of this character. Besides all this, the expenses of operation, which are high in a plantation of any importance, have to be taken into account, as the number of native agricultural laborers is relatively small and wages are not in proportion to the profits ordinarily derived from the business, especially now that there is so great a depression in agriculture in so far as the cultivation of the cane is concerned.

Prices of available land vary according to the quality and location from \$2 to \$2.50 Mexican currency per hectare, approximately 2½ acres.

Cattle and horses used in this country for agricultural and draft purposes are very dear, owing to the dire effects of the rinderpest; but thanks to the measure adopted by the government for the importation of cattle, carabao can be purchased at \$70, \$81, \$93, and \$100 Philippine currency per head, according to the terms provided by act 828 of the Philippine Commission.

The price of building lumber has increased threefold, due to the forestry taxes imposed by the government for the cutting of timber on public lands; and lime, brick, and other materials used in the construction of buildings on a sugar plantation have also increased proportionately in price. Last, the laborer, who prior to 1898 earned 20, 25, or 50 cents Mexican currency and subsistence, according to the class of labor performed, now demands twice as much before he will work.

The prices of all articles which go to make up a plantation and enter into the manufacture of the sugar having increased, the financial problem is one very difficult of solution to most planters. A scarcity of money and an absolute dearth of loan companies willing to make advances on agricultural lands and standing crops add to this difficulty to a not inconsiderable degree. Formerly the cost of production of a picul of sugar ready for market did not fall below \$1.50 Mexican currency, according to the class of land and distance from nearest provincial market center. Since the war, however, and the train of evils succeeding it that have wrought so much damage to the sugar plantations, operating expenses have considerably increased. It is estimated that at present the cost of producing a picul of sugar ready packed for market is all the way from \$2.50 to \$3 and even \$3.50 Mexican currency, not including the expenses incurred in the destruction of locusts, which at times are great and of themselves may cause a loss in the year's business.

According to data which have been obtained relative to the price of sugar in the markets of Manila, Iloilo, and Cebu, the principal sugar centers in the islands, quotations have fluctuated, as a general rule, between \$3 and \$5 per picul for superior, \$2 and \$3 for current, and from \$4 to \$6 per pilon. The prices paid during 1855, \$13; 1856, \$11; 1878, \$7.50; and \$6 at the beginning of the present year, when \$8 was paid per pilon sugar, are exceptional. All prices given are in Mexican currency.

From the foregoing data it may be seen that under the auspices of peace, and when backed by the financial help extended in the manner formerly done by such houses as Loney & Co., and Russell & Sturgis, of Iloilo, which lent money and furnished machinery on the crops, the cultivation of the cane made rapid progress during a period of not quite thirty years. During that period some three thousand plantations, large and small, were established. The former were 1,000 hectares and over in extent, while the latter were 200 and under. All these plantations were provided with sugar mills, the majority of which were operated by steam and the balance by hydraulic motors and animal power; some of them were also provided with tramways for the transportation of the cane to the mill and the manufactured product to the ports or market towns.

If the sugar industry has fallen into decay after having reached a high degree of prosperity in these islands, it is undoubtedly because of the overwhelming misfortunes which the planter is unable to withstand, in view of the fact that there are no banking or loan institutions here to which he can turn for relief.

Sugar Making and Manufactures.

Tables 6, 7, 8, and 9 relate to the sugar industry, which is not included in the tables preceding them. These four tables embrace the same items as those for other industries, except cost of materials purchased, which in sugar making as carried on in the Philippines is not ascertainable. In point of fact, the materials entering into sugar production are not purchased. They are almost universally produced by the same establishments or rancherias producing the sugar. Sugar cane, the principal material, compared with which all other materials used in this industry are of merely nominal value, is generally grown on the plantations of the proprietors who own and operate the sugar-making plants. Its cost of production is not reported, because it is unascertainable under existing insular methods of accounting.

With the foregoing explanation in mind, the reader will understand that the amounts reported as capital invested in the sugar industry include the sum of

investments in both sugar-cane growing and sugar making. The same is true with regard to the number and wages of employees, male and female. There is no separation in these items of mechanical and agricultural operations.

These tables present data, by provinces, relating, first, to all sugar-producing establishments the value of whose product was not less than 1,000 pesos in 1902; second, to such of the establishments as used steam power in their manufacturing branch; third, to such as used water power; and fourth, to those in which hand or animal power was used in pressing the juice from the cane.

It must be remembered that in the sugar-growing sections of the islands there are scores and hundreds of small sugar mills not included in the census, operated by hand or carabao, which produced individually small amounts of sugar of values less than 1,000 pesos, whose aggregate value was undoubtedly large. The sugar produced in these small establishments, as in many of the larger ones, is of a very low grade and would be regarded as totally unfit for use in America.

The tables are brief, and are so plain and simple in their composition as to require little analysis or discussion. Their totals are brought together in the following statement:

Sugar-producing establishments in the Philippine Islands using steam, water, and hand or animal power.

Kind of power used.	Number of establishments.	Capital (pesos).	Average number of wage-earners and total average monthly wages.						Value of products (pesos).
			Total.		Men.		Women.		
			Number.	Wages (pesos).	Number.	Wages (pesos).	Number.	Wages (pesos).	
All kinds.....	1,075	16,983,405	45,247	388,817	41,938	370,820	3,309	17,997	6,603,006
Steam.....	528	12,229,547	31,322	265,402	29,313	255,015	2,009	10,447	4,850,043
Water.....	77	1,582,207	4,001	36,720	3,631	34,566	370	2,124	609,378
Hand or animal.....	470	3,171,741	9,924	86,635	8,994	81,209	930	5,426	1,143,585

The relative importance of the sugar-producing provinces, as indicated by the value of sugar produced, is shown in the following table, in which the provinces are arranged according to their industrial importance in this respect, the number of establishments and the total and average values of sugar made in each province being given:

Number in order of importance.	Province.	Number of establishments.	Value of product.	
			Total (pesos).	Average per establishment (pesos).
	Philippine Islands.....	1,075	6,603,006	6,142
1	Negros Occidental.....	531	4,644,398	8,747
2	Pampanga.....	194	758,691	3,911
3	Iloilo.....	62	372,399	6,006
4	Negros Oriental.....	38	325,611	8,569
5	Cebu.....	69	149,268	2,163
6	Bulacan.....	38	83,070	2,186
7	Tarlac.....	33	62,206	1,777
8	Bataan.....	18	46,520	2,584
9	La Laguna.....	23	40,551	1,763
10	Cavite.....	15	27,452	1,830
11	Antique.....	14	26,018	1,858
12	Batangas.....	8	16,063	2,008
13	Leyte.....	9	11,460	1,273
14	Pangasinan.....	4	8,354	2,089
15	La Union.....	3	6,600	2,200
16	Misamis.....	3	6,586	2,195
17	Sorsogon.....	4	6,350	1,588
18	Rizal.....	3	6,190	2,063
19	Nueva Ecija.....	4	5,219	1,305
20	Capiz.....	2	(*)	(*)

* The total value of product and the average value per establishment in Capiz is included with that in Tarlac to avoid disclosing the operations of individual establishments.

There were more steam-power sugar plants in the province of Negros Occidental in 1902 than in all other provinces combined, 291 such plants having been in operation in that province out of a total of 528 in the islands. The value of product of these establishments was correspondingly large, having been ₱3,559,041, or 73.4 per cent of the ₱4,850,043 worth of sugar manufactured with the aid of steam machinery.

Pampanga stood next to Negros Occidental with 131 steam-power plants, a number in excess of the combined numbers in all other provinces, except the one above named, which amounted to only 106; and Pampanga also ranked second in value of product of this class of establishments, such value amounting to ₱596,285, or 12.3 per cent of the total.

The remaining 106 steam-power establishments were located as follows: Negros Oriental, 32; Iloilo, 26; Tarlac, 12; Bataan and La Laguna, 10 each; Cebu, 5; Bulacan, 3; Antique, La Union, and Pangasinan, 2 each; Batangas and Leyte, 1 each. The percentages of the total value of steam power produced sugar in these provinces were as follows: Negros Oriental, 6.5; Iloilo, 5.3; Cebu, 0.6; Tarlac, 0.5; La Laguna, 0.4; Bataan, 0.3; Bulacan, 0.2; Antique, La Union, Pangasinan, Batangas, and Leyte combined, 0.4.

In establishments using water power, Negros Occidental again ranked first and Pampanga second, both in the number of such establishments and in the value of their product—the first named having 45 and the second 15 water-power plants out of a total of 77 in all provinces, which produced 83.4 and 8 per cent, respectively, of the total value of sugar manufactured in establishments of this class, which amounted to ₱609,378. The number of water-power establishments in other provinces and their percentages of the total value of sugar made in all such establishments were as follows: Bataan, 8 (4.8); Antique, 3 (1.1); Cavite and Tarlac, 2 establishments each; Bulacan and Cebu, 1 establishment each—the percentage in the four provinces of the total value of production having been 2.7.

In establishments using hand or animal power, of which there were 470 enumerated in the archipelago, Negros Occidental again ranked first, with 195 such establishments. Cebu was second to Negros Occidental, with 63 plants; Pampanga third, with 48; Iloilo fourth, with 36; Bulacan fifth, with 34; and Tarlac sixth, with 19 plants. The remaining 75 establishments were located in 13 provinces, as follows: Cavite and La Laguna, 13 each; Antique, 9; Leyte, 8; Batangas, 7; Negros Oriental, 6; Nueva Ecija and Sorsogon, 4 each; Misamis and Rizal, 3 each; Capiz and Pangasinan, 2 each; La Union, 1.

The total value of the sugar produced in this class of establishments amounted to ₱1,143,585. The percentages of this value produced in the different provinces were as follows: Negros Occidental, 50.5; Cebu, 10.4; Pampanga and Iloilo, 9.9 each; Bulacan, 6.4; Tarlac, 2.9; all other provinces combined, 10.

The following statement shows the number of establishments engaged in the sugar-making industry and in all other manufacturing industries embraced by the nine tables to which the foregoing text relates, together with the value of their products in each province.

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TABLE 6.—Summary of sugar-producing establishments, the value of whose products amounted to 1,000 pesos or over in each establishment, by provinces: 1902.

	Province.	Number of establishments.	Capital, pesos.	Average number of wage-earners and total average monthly wages.						Value of products, pesos.
				Total.		Men.		Women.		
				Number.	Wages, pesos.	Number.	Wages, pesos.	Number.	Wages, pesos.	
1	Philippine Islands	1,075	*16,933,495	*45,247	*388,917	41,968	370,820	3,309	17,997	6,608,006
2	Antique.....	14	146,308	608	4,299	396	3,254	212	1,045	26,018
3	Bataan.....	18	149,680	741	9,730	704	9,481	37	249	46,520
4	Batangas.....	8	38,362	131	1,770	121	1,696	10	72	16,063
5	Bulacan.....	38	150,627	633	9,355	587	8,786	246	569	83,070
6	Cavite.....	15	51,325	194	1,882	176	1,780	18	102	27,452
7	Cebu.....	69	538,719	1,155	10,200	1,051	9,114	104	1,086	149,248
8	Iloilo.....	62	801,922	2,493	15,111	2,197	13,874	296	1,237	372,399
9	Ia Laguna.....	23	171,014	716	8,895	682	8,024	84	371	40,551
10	La Union.....	3	17,211	65	490	63	450	2	30	6,900
11	Leyte.....	9	108,500	119	3,051	110	3,002	9	49	11,460
12	Misamis.....	3	15,967	57	254	53	244	4	10	6,581
13	Negros Occidental.....	531	11,189,150	28,885	215,099	26,574	208,365	2,311	11,784	4,644,398
14	Negros Oriental.....	38	919,410	2,123	18,267	2,065	17,978	58	289	325,611
15	Nueva Ecija.....	4	14,649	24	216	24	216	-----	-----	5,219
16	Pampanga.....	194	2,432,745	6,323	78,969	6,272	78,623	50	346	758,691
17	Pangasinan.....	4	38,130	149	1,313	149	1,313	-----	-----	8,354
18	Rizal.....	3	1,108	25	615	19	552	6	63	6,190
19	Sorsogon.....	4	6,464	73	753	73	753	-----	-----	6,350
20	Tarlac ^a	35	82,165	728	8,558	672	8,313	56	245	62,206

* Not including unreported capital for 2 establishments in Negros Occidental.

† Not including unreported employees for 11 establishments in Cebu and 2 in Negros Occidental.

‡ Not including unreported wages for 11 establishments in Cebu and 2 in Negros Occidental.

§ Two establishments in Capiz are included in Tarlac to avoid disclosing the operations of individual establishments.

TABLE 7.—Summary of sugar-producing establishments using steam power, the value of whose products amount to 1,000 pesos or over in each establishment, by provinces: 1902.

	Province.	Number of establishments.	Capital, pesos.	Average number of wage-earners and total average monthly wages.						Value of products, pesos.
				Total.		Men.		Women.		
				Number.	Wages, pesos.	Number.	Wages, pesos.	Number.	Wages, pesos.	
1	Philippine Islands.	528	*12,229,547	*31,322	*265,462	29,313	255,015	2,009	10,447	4,850,043
2	Bataan.....	10	73,766	348	4,510	328	4,369	20	141	17,368
3	Bulacan.....	3	29,050	63	801	61	782	2	19	8,396
4	Cebu.....	5	116,063	229	762	218	729	11	33	27,825
5	Iloilo.....	26	567,472	1,718	10,100	1,489	9,047	229	1,058	259,486
6	La Laguna.....	10	111,289	420	5,216	377	4,780	43	436	22,500
7	Negros Occidental.....	291	8,382,491	21,108	159,789	19,540	151,944	1,562	7,845	3,559,041
8	Negros Oriental.....	32	884,761	2,030	17,755	1,974	17,471	56	284	317,706
9	Pampanga.....	131	1,886,351	4,806	60,003	4,772	59,763	34	240	595,285
10	Tarlac.....	12	45,784	299	3,997	292	3,927	7	70	23,454
11	All other provinces ^a	8	132,490	301	2,529	256	2,206	45	326	17,963

* Not including unreported capital for 1 establishment in Negros Occidental.

† Not including unreported number of employees for 2 establishments in Negros Occidental and 1 in Cebu.

‡ Not including unreported wages for 2 establishments in Negros Occidental and 1 establishment in Cebu.

§ Includes establishments distributed as follows: Antique, 2; Batangas, 1; La Union, 2; Leyte, 1; Pangasinan, 2.

TABLE 8.—*Summary of sugar-producing establishments using water power, the value of whose products amounted to 1,000 pesos or over in each establishment, by provinces: 1902.*

	Province.	Number of establishments.	Capital, pesos.	Average number of wage-earners and total average monthly wages.						Value of products, pesos.
				Total.		Men.		Women.		
				Number.	Wages, pesos.	Number.	Wages, pesos.	Number.	Wages, pesos.	
1	Philippine Islands	77	1,532,207	*4,001	*36,720	3,031	34,596	370	2,124	609,378
2	Antique	3	64,736	149	1,104	104	872	45	232	6,815
3	Bataan	8	75,894	393	5,220	376	5,112	17	106	29,152
4	Negros Occidental.	45	1,140,030	2,960	24,227	2,661	22,508	299	1,719	508,290
5	Pampanga	15	211,942	413	5,186	408	5,161	5	25	48,899
6	All other provinces	6	39,006	86	983	82	943	4	40	16,222

* Not including unreported number of employees for 1 establishment in Cebu.

^b Not including unreported wages for 1 establishment in Cebu.

^c Includes establishments distributed as follows: Bulacan, 1; Cavite, 2; Cebu, 1; Tarlac, 2.

TABLE 9.—*Summary of sugar-producing establishments using hand and animal power, the value of whose products amounted to 1,000 pesos or over in each establishment, by provinces: 1902.*

	Province.	Number of establishments.	Capital, pesos.	Average number of wage-earners and total average monthly wages.						Value of products, pesos.
				Total.		Men.		Women.		
				Number.	Wages, pesos.	Number.	Wages, pesos.	Number.	Wages, pesos.	
1	Philippine Islands	470	*3,171,741	*9,924	*86,635	8,094	81,209	930	5,426	1,143,585
2	Antique.....	9	48,822	339	1,999	212	1,482	127	517	14,903
3	Batangas.....	7	28,762	111	1,629	106	1,567	5	42	13,284
4	Bulacan.....	34	112,828	561	8,379	517	7,829	44	550	73,375
5	Cavite.....	13	43,425	161	1,570	143	1,468	18	102	18,437
6	Cebu.....	63	406,626	926	9,438	833	8,385	93	1,053	119,518
7	Iloilo.....	30	234,450	775	5,011	708	4,827	67	184	112,913
8	La Laguna.....	13	58,725	296	3,679	255	3,244	41	435	18,051
9	Leyte.....	8	128,500	108	2,959	99	2,910	9	49	10,460
10	Misamis.....	3	15,967	57	254	53	244	4	10	6,596
11	Negros Occidental.	195	1,666,629	4,817	31,083	4,367	28,913	450	2,170	577,067
12	Negros Oriental.	6	34,649	93	512	91	507	2	5	7,905
13	Nueva Ecija.....	4	14,649	24	216	24	216	-----	-----	5,219
14	Pampanga.....	48	334,452	1,109	13,780	1,062	13,609	17	81	113,507
5	Sorsogon.....	4	6,464	73	753	73	753	-----	-----	6,350
16	Rizal.....	3	1,168	25	615	19	552	6	63	6,190
17	Tarlac.....	19	16,539	314	3,962	304	3,862	10	100	32,770
18	All other provinces ^d	5	18,066	135	796	96	731	37	65	7,060

* Not including unreported capital for 1 establishment in Negros Occidental.

^b Not including unreported number of employees for 9 establishments in Cebu.

^c Not including unreported wages for 9 establishments in Cebu.

^d Includes establishments distributed as follows: Capiz, 2; La Union, 1; Pangasinan, 2.

[Farmers' Bulletin No. 1.]

A PRIMER ON THE CULTIVATION OF SUGAR CANE.

[By William S. Lyon, 1902.]

LETTER OF TRANSMITTAL.

SIR: I have the honor to transmit herewith, and to recommend for publication as a Farmers' Bulletin, the manuscript of a paper on "The cultivation of sugar cane."

The importance of the sugar industry to these islands can hardly be overstated. At the present time it furnishes all the sugar required for domestic consumption and a surplus for export, which, in 1900, amounted to 143,719,971 pounds, valued at \$2,397,144, and, with the exception of hemp, this industry gives employment to more of our rural population than any other branch of agriculture. Diminished cane areas, diminished crops, and diminished profits entail suffering in the rural districts that extends far beyond the landed proprietor or owner of a sugar estate. Abandoned cane fields and idle mills throughout the archipelago indicate a depression of such magnitude as to render it incumbent upon this bureau to do everything in its power to remedy these conditions.

The causes producing the present depression in the sugar industry, other than those resulting from the prevailing financial conditions and excessive rates of interest on mortgage loans, are to be found both upon the farm and in the mill. The present practices plainly indicate a lack of knowledge of certain fundamental principles in cane cultivation, and the purpose of this paper is to place before the cane grower in compact form the elementary information essential to the success which lies within his reach.

Respectfully,

WILLIAM S. LYON,
Expert in Tropical Agriculture.

Prof. F. LAMSON-Scribner,
Chief, Insular Bureau of Agriculture.

INTRODUCTION.

Upon most modern estates the manufacture of sugar is carried on in connection with the growing of the cane, but this is not always the case, and cane growing alone may be profitably followed by those who have no milling plant, but who must deliver their crop to the nearest crushing mill.^a The conditions for profitable returns are exceptionally favorable upon these islands; the climate can not be surpassed, the cane soils are unequalled, there is abundant water supply, the facilities for transportation by water are unusually good, while the difficulties of land transportation will be quickly overcome by the successful planter. It must be the aim of the cane grower to produce upon a given area the maximum of both tonnage and quality in order to secure the greatest profit. This can only result from a judicious selection of land, both as to location and soil, a careful selection of the most productive varieties of cane, and the highest class of tillage and management of the growing crop.

^a This is the general practice in New South Wales, where the numerous holdings are, as a rule, small in area. The cane is purchased from the planters, principally by the Colonial Sugar Refining Company, whose various crushing mills and refineries are fitted with machinery of the most modern character.

LOCATION OF FARM.

The essential feature for the consideration of the grower who does not design to crush the cane himself lies in the accessibility of his farm to a mill. The measure of this accessibility will be determined entirely by the cost of transportation, which will depend on the condition of existing roads; the cost of construction of new ones, or of tramways; or the availability of waterways for more distant carriage. This last in these islands is so valuable a means of transportation that it can be utilized for the extension of cane growing into regions that otherwise could not be made available.

Most modern sugar mills are now equipped with unloading facilities, and by the aid of special labor-saving contrivances effect the discharge of cars, carts, and boat loads of cane with remarkable ease and celerity. These are all contributory factors to "accessibility" and are, therefore, mentioned in this connection.

The next feature that commands attention in the selection of a sugar-cane farm is the suitability of the soil for the designated purpose. It has been contended that sugar cane can be made profit paying upon any land when the rainfall is sufficient and the other climatic conditions are favorable.

It is also conceded by the many authorities responsible for this contention that there are many requisites necessary to bring unsuitable lands to a state of productivity; and that, except in regions where the needed supplies are cheap and plentiful, it is inexpedient to attempt their reclamation to sugar growing. In the Philippines lands exceptionally well fitted for the growing of sugar cane are so abundant that there seems to be no valid reason for the selection of those that can only be reclaimed to this use by tedious and costly processes.

In determining the suitability of the soil we have, as a matter of first consideration, its physical or mechanical condition.

SOIL CONDITIONS.

With a possible exception of tobacco, there is no staple agricultural crop where the physical condition of the soil plays so important a part as it does in the growing of sugar cane. It is a plant that, by virtue of its great size and rapid growth, not only draws heavily upon the fertility of the soil, but its shallow root system and restricted area for each plant demands that the mechanical condition of the soil be such as to facilitate in every way the full exercise of the root's functions. In all regions and in all sugar-producing countries, a strong, deep, argillaceous, or slightly calcareous soil has always been found best fitted to meet these requirements.

In the sandy, sedimentary, alluvial soils along the seacoast, or in rich mountain valleys, heavily charged with the humus in which the cane rejoices, phenomenal crops are often taken, but for long-continued cropping and with a minimum of restoratives the soils first mentioned are those which have longest stood the crucial test of time.

Such lands as these abound in the archipelago and often extend for miles along the lower and easily cultivated foothills, and these to-day offer more inviting fields of operations than many of the apparently more alluring valley lands along the coast.

The land chosen must not be less than 1 foot in depth, but that will be sufficient, provided the substratum on which it rests is permeable to water. The perfect permeability of the subsoil is a *sine qua non* for the perfecting of the cane, for stagnant water at the roots is a more dangerous menace to success than long-continued drought. It is this peculiarity that clearly differentiates valley lands suited to cane growing from those adapted to rice, an aquatic grass, whose roots thrive in the same soil as the cane, but which must be underlain by an impervious subsoil that will retain water throughout the growing season.

Nevertheless, the planter need not be discouraged who finds his shallow top soil underlain by a formidable bed of clay. In most cases it will be found full of stones, bits of tufa of volcanic scoria, and, unless it lies perfectly level with the water table close to the surface, is at times susceptible to the free and rapid percolation of water.

It is suggested to the prospective cane planter who is unfamiliar with the physical character of the subsoil that he dike a small experimental plot of land, making his dikes as nearly waterproof as possible, and then observe the behavior of the land subsequent to one or two torrential rains, noting the tardiness or rapidity with which the water disappears. If, after a 2-inch rainfall upon

soil previously wetted through, the water remains standing for more than two or three hours, a complete and comprehensive system of drainage is essential before putting such lands into cane.

SOIL FERTILITY.

Fertile soils can nearly always be assured in what are known as "virgin soils," and such are at present in almost unlimited quantities in these islands. It may seem paradoxical to say that on a narrow sea zone, densely peopled by a race who have been engaged in agriculture for generations, virgin lands are more abundant than in what we call a new country within temperate latitudes. Strictly speaking, such is not the fact, but within the Tropics land that has once been cultivated and then allowed to lapse so quickly reverts to its primitive condition that in a very few years it effects what would require a generation to accomplish in a northern climate and to all practical intents becomes once more virgin land. Such lands are more valuable in some respects than the undisturbed soil of the primeval forests. Their reclamation to cultivation is more cheaply effected, while the rapidity with which the processes of growth and decay progress in the Tropics is assurance of a liberal supply of the humus, the one fertilizing agent of all others most vital to the highest perfection of the sugar cane.

In some tropical forest regions the remains of decaying vegetation are so great that they are sometimes present to an almost injurious excess.

On such soils, as also occasionally upon truly virgin sedimentary river bottoms, the cane develops to a size and with a luxuriance that is phenomenal; yet in this abnormally excited growth it frequently becomes gorged with unassimilated alkaline salts prejudicial to sugar making, difficult to eliminate, and depreciative of the market value of the cane.

But the quasi virgin land that has only the accumulated vegetable detritus of a few years offers a happy medium for the growth of a strong, vigorous cane, rich in the precious saccharine matter that crystallizes freely and that always commands the highest price in the sugar mills of the world. Under the question of soil fertility it is pertinent to inquire if some practical suggestion can not be made whereby the equilibrium of the humus in the soil in relation to its mineral elements may be constantly maintained.

A piece of land by the irrefutable logic of good money returns may have demonstrated its superiority for growing cane; it may teem with the elements of soil fertility, yet in a few years the humus is depleted and the cane and its value rapidly begin to deteriorate. There can be no middle course—the exhausted humus supply must in some way be restored.

Humus, as we know, serves a two-fold purpose—one, purely mechanical in its effects, rendering stiff soils pervious to the aeration and moisture, without which perfect root action can not be maintained; the other, the added fertility which it supplies. It is rich in available nitrogen, without which, and notwithstanding a surfeit of other fertilizing agents in the soil, there can be no successful issue to a cane crop.

The two materials known to common agricultural uses that most nearly approximate humus in their action are stable or barn manures and cotton-seed meal. Both these substances are not only rich in nitrogen, but both, while undergoing decomposition in the soil, exert mechanical influence analogous to that of humus.

In countries where cotton is grown and farm stock housed or corralled one or both of these invaluable agents are easily obtained, and no difficulty is experienced in growing a succession of cane crops and in preserving continuously normal soil conditions. In these islands we are practically excluded from the consideration of either, for cotton is not produced in commercial quantities and, outside of a few large cities, the stall feeding of farm animals is unknown, and consequently the use of barnyard manures is out of the question. In this extremity there is no alternative for the cane grower but to lay down his cane fields every third year to, say, cowpeas, vetches, or some leguminous crop that will compensate for the more direct fertilizers that he is unable to procure. As a result, one-third of his sugar fields will be annually unproductive of sugar. Nevertheless there is little doubt that eventually the farmer will be enriched by the operation. These renovating crops can first of all be partly cut and cured for forage, and will afford assured maintenance for the stock that is an indispensable condition to the profitable working of the farm. Stock so fed, if not immune, will at least be far less susceptible to epi-

demio diseases than those allowed to roam at large over pastures where the herds have previously been decimated by disease.

In addition, the yard feeding of his cattle will necessarily result in the accumulation of manures that if properly protected from leaching by rains will place at his command one of the best means for maintaining continued productivity. In the end, after the saving of the forage, there still remains the stubble, which, when plowed under, acts as humus, while the deep-rooting legumes have not only subsoiled his land, but have stored up while he slept an abundant supply of the nitrogen in the cheapest available way.

A practice in some places in the islands is for planters to "rest" their cane lands every alternate year. Such rests, it may be remarked, are quite as "tiring" to the land as its continuous production of cane. The rest does not last long enough to restore the growth that would in time renew it, nor is it even fallow plowed, which would at least greatly improve its mechanical condition. The "rest" is simply idleness, productive of ill rather than benefit.

PREPARATION OF THE SOIL.

If the land is what we now understand to be virgin soil, the brush and timber will be cut closely to the ground,^a any wood required for fuel removed, and the remaining tops and branches, when dry enough, gathered in small heaps and burned. Large fires are to be avoided, as the smoldering embers are apt to ignite and burn out much of the precious humus in the soil. It is on this account maintained that all trash should be removed and burned outside the plantation limits. Nevertheless, if the fires are kept small in size, the loss from this source will be inconsiderable and hardly great enough to compensate for the extra cost of handling or for the potassic salts lost by the removal of the brush from the ground; but, most important of all, the scattering and burning of the brush not only kills and facilitates the subsequent removal of the stumps, but helps to destroy the larvæ of pernicious insects that abound in most forest lands.

The grubbing of the stumps can not be profitably undertaken till the rains have thoroughly wet down the soil, and then small roots are easily taken out with a grub hoe, while larger ones that are well charred may be easily removed by carabao.

It is only the largest stumps that should be left to decay. This process is so rapid in this climate that their early extirpation is an easy matter. Unless of extraordinary density of foliage a few standing forest trees are seldom detrimental to field crops. To this the sugar cane is a notable exception. It rejoices in full, free, and unbroken sunlight at every stage of growth, and the greater its intensity and long continuance the greater the assurance of a good yield of sugar.

BREAKING THE SOIL.

The proper initial preparation of the soil presents probably the gravest difficulty with which the cane planter on these islands must contend. The lack of animals and implements adequate to open up and aerate the soil for all the depth to which it may be traversed by the cane roots is indispensable to success, and further on the only solution of this problem that now seems feasible will be presented. Where the initial preparation of the soil has been thorough there is little subsequent occasion for the use of implements of heavy draft. A few years ago the deep subsoil plow and the turning of the land for a foot or 14 inches was considered essential. Now the investigations of chemistry have demonstrated that the available, i. e., the readily assimilated plant food, is that which lies close to the surface, and that the deep burying of this surface soil and its replacement with elements not yet sufficiently disorganized to serve as plant food contained in the under soil is wasteful of both energy and material. As now understood deep plowing serves only a mechanical purpose and no more than to guarantee porosity and a free aeration of the underlying beds.

The subsoil plow has therefore been generally consigned to the things of the past (except for uses not pertinent to this subject), and it is regrettable to have

^a The writer has lately observed some interesting experiments in clearing, where the brush was topped at 3 to 4 feet from the ground. The supposition is that, in the process of grubbing, the standing butts can be used as levers for the expeditious and easy eradication of the stumps.

to recommend its resurrection for some existing conditions in this archipelago. These conditions are mainly found upon the clay cane lands, where for many years the soil has been lightly skimmed with a small plow for a depth of 2 or 3 inches, and at this depth the soil is crusted with a polished, impermeable floor, which is the reverse of what is desired and which must be broken up and pulverized if these lands are to be made remunerative. That they bear unprofitable crops is no cause for surprise. The real cause of surprise is that they produce even half a crop of cane, and that they still do this speaks volumes for the wonderful adaptability of the climate and the remarkable fertility of the land itself. On such lands as these there seems no escape from the operation of the subsoiler, as no other implement will quite penetrate and open up this artificial hardpan. Upon virgin land any good deep-breaking plow will answer, although the modern disk plows that turn a furrow of any desired depth are preferred. In this plow the rotating disk, instead of sliding along the furrow, leaving a compact bottom, releases the farmer forever from the perplexing question of future subsoilings. This disk plow and the double-moldboard plow for the economical building up of beds and opening out drains are the only heavy draft implements required for the cultivation of cane. All subsequent tillage is prosecuted with light-draft disk harrows and cultivators of easy manipulation and should properly be considered under the head of "crop cultivation" rather than that of soil preparation. In stiff soils the disk plow can not be used with less than 3 good American horses or mules, and it is doubtful if it could be well operated in such lands with fewer than 6 carabaos. At this time, when the sugar districts of the islands have been almost depleted of their live stock, it seems inopportune to recommend the doubling up of draft animals by the use of heavy machinery. Still, it should be remembered that these plows throw a furrow slice of 20 to 24 inches and will readily and properly prepare 4 to 5 acres in a day, which is more than 6 carabaos will imperfectly accomplish in the same time with the small plow now in general use.

The question of the application of these useful implements to the preparation of cane lands, therefore, resolves itself into a question of motive power, and to the judgment of the farmer, who must decide if a possibly smaller acreage placed in a perfected condition does not offer greater inducements than a larger acreage ill prepared and fraught with prospects of crop failure.

Under the existing live stock conditions, no other suggestion can be made at this time than that given above of doubling up the available farm animals until the required motive power is secured, and it is recommended with the assurance that the farmer's gains from a smaller, well-handled acreage will more than compensate for the loss of acreage that this concentration of power implies.

In preparing valley land for planting, some provision must be made for times of flood that does not apply to uplands. After the first heavy plowing the land is to be fined down with a good harrowing. If the soil is of free, open texture and handled at the time when still moist but not sticky, the common form of sectional harrow will do good work. If inclined to be cloddy the disk harrow will reduce the soil to the best condition of any tool in common use. The land is then to be laid off in 5-foot beds, the middles between them being opened up with a double-moldboard plow. In valley lands that have been kept in the best condition, it is here that the only occasion should arise for the use of the subsoil plow for the purpose of deeply opening up these middles, which will serve the double purpose of drainage and of supplying soil for the elevation of the beds. The depth or shallowness of these furrows will be governed by the susceptibility of the land to overflow.

In many tropical regions, and in most of the Philippines, the cane beds are only made $3\frac{1}{2}$ to 4 feet apart, but where the highest skill is exercised and upon good soils the 5-foot planting should yield a tonnage equally large and at a great saving of expense in both labor and seed cane.

SELECTION OF SEED CANE.

The cane used for seed should always be well ripened and selected from such stools or "ratoons" as from mill tests show the most sucrose and the highest purity. Careful selection for a few years, and the reservation of a portion of the plantation for nursery purposes, will enable the planter to maintain his seed cane at a high standard of excellence. The varieties used here seem to be confined to the green and yellow sorts, of probable Javanese origin. These canes, though rich in sucrose, are generally small and insufficient in tonnage yield per acre. Further, and whenever there is a steady decrease in size from lack of

proper cultural methods, the deterioration is accompanied with a relatively greater increase of fiber that, in its turn, represents another loss at the mill. The many useful striped, rose, and purple canes, that have contributed to bring Hawaii to the front as the most prolific and profitable sugar region in the world, have not, so far as can be ascertained, been planted in these islands.*

Exhaustive tests have definitely established the fact that the upper two or three feet of the cane—the part least valuable at the mills—is well suited to seed purposes, and that no sugar deterioration has occurred from its long-continued use. These tops can be all used, except the extreme tips, which are sometimes inclined to “arrow.”

PLANTING.

As soon as the ground is prepared a shallow furrow or trench is opened down the center of the bed with a double-moldboard plow and the cane laid down in the trench, the end of one piece touching the next throughout the whole row. It is the custom, here and in Hawaii, to cut the cane into single nodes a few inches long and drop them at close intervals in the furrow. Such a practice undoubtedly assures a stand from every joint; but if the land has been brought to a fine condition of tilth and the whole of the cane is in intimate contact with the soil, every joint in the piece should break into bud. It will also be seen that the process is more expeditious and labor saving.

Previous to planting the seed cane should be soaked for two hours in lime water of the strength of 2 pounds of slaked lime to 1 gallon of water. This is recommended for the destruction of the eggs of pernicious insects; but in every instance a rigid scrutiny of the seed cane should always be made, and any piece that has been attacked by borers should be rejected. As a remedial measure I would place more faith in a soaking of the cane in well-diluted carbolic acid; but, in view of the fact that the lime dressing furnishes at once to the young plant an always-to-be-desired and necessary element of fertility, this time-honored custom of all countries may be generally adopted.

In this country the trench for planting may be shallow and the soil covered back with a light plow or disk harrow. Where irrigation is not to follow, or where rainfall is so great that the water-carrying capacity of the middles is apt to be overtaxed, all subsequent plowing or tillage should be toward the cane row, with the end in view of having it always above water.

AFTER-TREATMENT.

The cane when planted, if followed by good rains or by irrigation, should begin to sprout within a week of the time it is wetted down, and this is the time when the progressive farmer has recourse to the so-called mineral fertilizers for the increase of crop and the maintenance of soil equilibrium. Aside from the humus and the means of providing for it that has already been discussed, there are two essential ingredients of soil fertility that exist in all rich lands, but upon which the sugar cane makes extraordinary drains, and the application of these in the most available forms not only meets with an assured response in a marked increase of crop, but is a guaranty of a continued state of soil fertility that leaves the farm capital always unimpaired. These ingredients are phosphoric acid and potash, and there are apparently no insuperable obstacles in the way of obtaining either. The former is probably to be had from the many deposits of bat guano that exist in the archipelago, and wherever these deposits are found in caves or have been protected from rain they are almost certain to be rich in this valuable element. If the planter is remote from any such source or from any known phosphate deposits, there seems to be no alternative than its purchase and importation from the Sandwich Islands or the United States.

These salts are more useful in the form of acid phosphates, and are commercially known as “superphosphates” and carry from 10 to 20 per cent of soluble phosphoric acid, and their cost is always based wholly upon the percentage of the acid they carry. In any event the amount required is small (200 to 400 pounds per acre) and at any reasonable cost it should be obtained.

*Through the commendable enterprise of Capt. G. P. Ahern, Chief of the Forestry Bureau, an importation of these Hawaiian canes was recently made to this country, and efforts will be made, by their rapid propagation and further introductions, to effect future distributions of the same to planters. F. L. S.

The supply of potash does not appear to be of such pressing concern with the cane planter. Not only, if his land has been cleared and burned over, there has been returned a considerable supply of this element, but the indications are that most of the sugar lands of the islands are already rich in potash. Without recourse to a chemical analysis there is a simple, practical test whereby the farmer can determine this question for himself. Let him select two or three or more small plats typical of as many different soils as the farm shows and lay them down for two or three years to different kinds of lucerns and clovers, giving them no manuring whatsoever. If the growth from these plats is luxuriant, and they only suffer from causes directly attributable to long-continued drought, he may reasonably conclude that his land is provided with enough potash to meet all the requirements of cane growing for many years.

In the use of acid phosphates or of bat guano there is a process that is both effective and economical for its application. It may be scattered lightly in the furrow at the time of cane planting; or, if it is used in the form of bat guano, and where it is probably in combination with valuable nitrates, a furrow may be opened close to the cane, and the fertilizer scattered lightly and evenly along both furrow and furrow slice, and then all harrowed down smoothly with a disk harrow. There are drills now in common use that are adjusted to deliver commercial fertilizers directly where required and in precise quantities, but careful hand sowing can be made equally effective.

It should be remembered in the application of manures of this class that they are exceedingly soluble, and the greatest benefit from their use occurs at the time when light showers are prevalent. If applied at the time when the heaviest and long-continued rains are anticipated, a very large proportion of the valuable elements will be leached out of the land and carried away in the middles and drains. For the rest, all the subsequent cultivation to be given until the rows are crowded with suckers, and the cane ready to lay by and ripen, is a constant but superficial stirring of the surface with either hoe or cultivator.

After every rain, or so soon thereafter as the soil will admit of working, this cultivation should never cease. It is the keynote of the successful issue of the crop, and all the careful soil preparation and soil amendments that have been bestowed in previous months are largely nullified if a hard, compact crust is permitted to form and remain upon the surface. When the rows are completely crowded with cane and the ground well shaded, this surface induration will no longer occur, and the planter can await the ripening of his crop with the assurance that every hour of toil expended upon cultivation will be many times repaid.

HARVESTING THE CROP.

When the cane is ripe, and this is easily determined by the cessation of growth and a general deepening in color, it is ready for harvesting. It should be cut very close, or even with the ground in this climate, and the tops and leaves trimmed off, when it is ready for delivery to the mill. The tops are then gathered and buried in trenches of moderately dry soil until required for planting. The leaves and trash are gathered and burned or else covered deeply in a furrow made by a double-moldboard plow and allowed to decay. Both processes have strong advocates among expert sugar growers, but the process to be most commended will depend on circumstances. If there be the slightest evidence of fungous growth or the presence indicated of any sap-sucking or cane-boring insect whatsoever, there is no option. Every vestige of refuse should be burned. If such is not the case and there is, on the other hand, difficulty in obtaining stable manures or other humus-making ingredients, burying the trash will go a long way toward the maintenance of soil fertility, and is the best solution of the question of its disposition.

MANAGEMENT OF STUBBLE.

At one time three-fourths of all the cane grown on these islands was from stubble crops. Now, by long-continued depletion of the land in many districts it has become necessary to lay down the land to new seed cane every year; and this system, despite its wastefulness, seems to be the only one that affords planters any assurance of even a half crop.

Where the lands are not hopelessly exhausted or facilities are at hand for their renovation, there is no excuse for this wasteful policy; and virgin land, or land that is maintained in rotation, should be profitably handled for the second

or even a third year. The rational method of treating the plantation destined to be carried over a second season as stubble cane would be as follows: In the process of harvesting the soil will be more or less compacted by the trampling of the cane cutters, by the cleaners, and by the carabao used in hauling away the crop. A thorough and deep plowing is therefore once more necessary, and to this must be added a complete forking over of the land in the stubble row itself. This may be effected by hand, although there is a machine now in common use, known as a "stubble digger," which has a revolving, cultivator-toothed attachment that works up the soil effectively and with remarkable speed directly in the row, and, with a little care, rarely tears out a stubble root. From this point on the manurial treatment and cultivation of a stubble crop is a practical repetition of that given to the seed-cane crop. This, in fact, would be the outline indicated for continuous succession of crops were it not for the difficulties that confront the Philippine planter in the procurement of complete fertilizers and which imperatively call for a crop rotation every third year if he would preserve the maximum sugar yield for an indefinite time.

There is no reason why the third or rotation year should be operated at a loss or be given up wholly to soil recuperation. The method practiced in Mauritius, Reunion, and most of the French colonies would doubtless be successful and profitable here. The third year the same stubble is grubbed out, the land laid down as usual, and planted to corn. When this has made fair growth and begins to "tassel" out, the ground is sown broadcast to vetches, cowpeas, or some other quick leguminous soiling crop. A fair to good crop of corn is usually secured, and the leguminous forage is pastured down till the season comes for plowing it under and reseeded the land to cane. This pasturing can only be done without injury during the dry season, and the farmer who turns carabao in to pasture in wet cane lands is inflicting incalculable mischief that will take years of reparative treatment to overcome.

DRAINAGE AND IRRIGATION.

There are two subjects pertinent to the matter under consideration that will be made the subject of future bulletins and that can only be briefly touched upon in this paper. They are drainage and irrigation. The former is indispensable to attaining a maximum of success upon the littoral lowlands of these islands, and ultimately a comprehensive system of drains will control every well-equipped and well-managed plantation in the archipelago. The evil effects of stagnant water have been already pointed out, and the indispensable necessity of deep, broad, middle ditches and laterals for the rapid diversion of storm waters, has been insisted on elsewhere. These middles and laterals, however, are but makeshifts offered for the immediate amelioration of water-logged cane fields until they can be otherwise properly reclaimed. Open drains, to be efficacious, must be constantly kept clean and in repair. This entails constant labor and a very considerable and unnecessary sacrifice of land. Stone-filled drains made of broken stone of graduated sizes are expensive, and in time are apt to become clogged with fine silt. Tile drains will be the final recourse, and the excellence and abundance of the clay and the skill shown by the Filipinos in its manipulation are additional reasons for advocating their use. The financial condition of the planters at this time justifies a recourse to the expedients previously mentioned, and the hope is expressed that the profits arising from a better scheme of cane growing may eventually enable them to place their fields in the highest and most profitable condition.

It is well known that a perfect system of tile drainage is almost a guaranty against the evil effects of drought. To those who lack full comprehension of the subject, it appears paradoxical that a system primarily designed to dispose of surplus water in the soil will, at the same time, acts as an agent for its restoration. Such is the case, however, and on the principle that nature abhors a vacuum there can be no evaporation of the surface waters without a supply constantly being drawn from below to replace it. Further, this, like all water that is in motion, is pure, sanitary, and drawn upward through the cane roots in just such quantities as they can appropriate with the greatest benefit, and in dry seasons, unless in excess, never flows to waste in the drains. It is, in short, the auxiliary to the planter in the valley that irrigation is to the cane grower on the uplands.

The uplands promise to be of long-enduring value, and, ultimately, more profitable than the valleys. The abundant water supply that prevails in all the

districts where sugar is now grown is available for the reclamation of immense areas to this purpose. Here the planter has positive and complete control of the situation. He is free from the ever-recurring possibility in tropical countries of disastrous flood or inundation, while the danger of protracted drought need not be considered as an element of crop failure. His control, in short, is so perfect that he can apply moisture at the times when it is most beneficial and withhold it completely as his crop approaches maturity, when continued rain or moisture would increase the sap in the cane, at the sacrifice and loss of the sucrose he has patiently striven to elaborate.

Large areas of these uplands are frequently quite level, or with a gentle slope toward the sea, and consequently present ideal conditions for the ready distribution of irrigating waters. Some of the most valuable lands are, however, more or less undulating, and although susceptible to irrigation, the successful manipulation of the water requires attention to some simple engineering problems, which are, however, too extensive for treatment at this time.

CONCLUSION.

In conclusion, it may be said that the rational treatment of sugar cane involves that it be forced, and forced constantly, from the day the cane first sprouts till it is ready to lay by and ripen. This forcing process can hardly be overdone, and involves an adequate water and food supply and such constant tillage and forcing as will enable it to assimilate every particle of the food and water given. A check of any kind is fatal to the fullest measure of success, and the cessation of the functions of growth for only a few days means the elaboration of starch and fiber in lieu of the sucrose we are after.

In common with every other form of vegetable life, vigor and luxuriance of growth affords more general immunity from the attacks of predacious insects or fungoid growths and a consequent saving from the losses which these entail.

GROWING SUGAR CANE IN HAWAII.

[Extract from a report on the agricultural resources and capabilities of Hawaii, by William C. Stubbs, Ph. D., published in Bulletin No. 95, United States Department of Agriculture, Office of Experiment Stations.]

The dominant crop in Hawaii is sugar. * * * Few places in the islands where cane can be grown at all will yield less than 30 to 40 tons per acre. * * *

The table-lands surrounding the islands at elevations of from 20 to 500 feet constitute the chief sugar areas. * * * There are about 60 plantations on the islands which yielded in 1898-99 about 300,000 tons of sugar. These plantations have about 100,000 acres in cane, one-half of which is harvested every year. * * * Under irrigation as much as 10½ tons of sugar per acre has been the average of one plantation * * *.

Table showing expenses per ton of sugar grown, and per acre.

Plant cane.	Per ton.	Per acre.
Clearing.....	\$0.54	\$5.51
Mule and steam plowing.....	1.41	14.50
Ditches.....	.30	2.05
Cutting and hauling seed.....	.80	8.22
Preparing and planting.....	.88	9.04
Fertilizing.....	4.01	41.13
Watering.....	3.08	37.18
Hoeling and weeding.....	.78	7.85
Stripping.....	1.40	15.25
Cutting and hauling cane.....	3.48	35.62
Pumping expense.....	2.42	24.64
Sundry accounts (rent, interest, and all other expenses).....	5.23	54.68
Manufacture.....	2.65	27.15
Containers.....	.99	9.77
Total.....	28.59	292.74

Plant cane:

Total yield of cane.....	tons..	117,835
Yield of cane per acre.....	do.....	78.9
Purity of juice.....	per cent.....	87.07
Amount of cane required to produce 1 ton of sugar.....	tons.....	7.71
Total production of sugar.....	do.....	15,289.5
Yield sugar per acre.....	do.....	10.24

On the leeward side of the islands, where irrigation is practiced, the land is broken with steam plows to a great depth. Rows are laid off at 5-foot intervals with very deep double-moldboard plows. Into these deep furrows the tops of the cane are dropped in a continuous row, the soil is drawn in lightly with hoes and a shallow stream of water sent over the buried tops. In six to seven days a continuous stand of young canes is obtained. For the purpose of economizing water the rows are laid off as nearly on a level as possible, and an open furrow for irrigating is maintained during growth. After each irrigation hoes draw in from the adjoining ridges small quantities of soil in order to conserve the moisture applied. Save irrigation and its incident hoe work, and the threshing of cane no other cultivation is given. A contract is usually made with a head Chinaman to irrigate and thresh the cane, from planting to harvest, at so much per ton of cane harvested. The contract is usually for 100 acres, the company furnishing the water. Contracts are also made by the ton for the cutting and delivery of the cane at the sugarhouse, the company furnishing the cars and engines. The breaking of the land and the planting of the cane is usually done with hired labor.

On the rainy or windward side of the island the conditions require entirely different methods from those just described. The lands are broken in a similar manner, but less deeply, and the tops are planted in an open furrow and covered. When the plants are large enough, the work of cultivation begins, which is usually done with plows, cultivators, and hoes. This cultivation is continued until the canes are sufficiently advanced to "lay by." Every operation is similar to the best practice in the cornfields of the West. Here reliance is placed entirely upon the rainfall for furnishing the needed moisture to canes. Sometimes the rainfall is excessive, at others deficient. Severe and protracted droughts, which occasion great loss to the planters, occur at rare intervals. As a rule, however, the rainfall is ample for good crops, and the extra expense of irrigation is avoided. Hence frequently the windward plantations are just as good dividend payers as the leeward estates, though the yield per acre are much less. Threshing of cane is practiced here as on the leeward side. In both instances the dead leaves are piled up between the rows, where they remain until after harvest, when they are burned. "Rattooning" or "stubbling" is not largely practiced. Only first-year rattoons or stubbles are cultivated. When ever, in the judgment of the manager, these will not produce 30 tons of cane per acre they are plowed up and the land replanted. Just here is one of the secrets of the large success attending sugar growing on these islands. Two-thirds, if not three-fourths, of the area each year is in plant cane. In Cuba, Porto Rico, and other tropical islands cane is permitted to run for six to even sixteen years, with the unavoidable result of annually diminished acre yields and a low average sugar output. Sugar planters elsewhere are disposed to doubt the accuracy of the large published yields of Hawaii. Let them consider their own enormous yields from plant cane and then apply such results to their entire plantations before they begin to question outputs obtained in these islands. It is true that irrigation upon fresh lands, upon the warmer leeward sides, in a climate almost perfect for maximum growth, has greatly increased the average output of Hawaii, but the carrying of the largest portion of the crop as plant cane is unquestionably the main cause of the large yields. This is evident by the yield obtained on the rainy or windward side of the islands, which are much larger than those obtained in Cuba and other tropical countries, even though much below the returns of the irrigated plantations on the lee side of the same islands.

The cane when harvested is delivered to the sugar mills by wagons drawn by oxen or mules, by rail, with horses or steam, by water flumes sometimes crossing deep gulches, and by trolleys. Plantations use either one of the above methods to suit their peculiar environments.

[From hearings before the Committee on Ways and Means, House of Representatives, January 23-28 and February 3, 1905, page 139.]

COMMITTEE ON WAYS AND MEANS,
HOUSE OF REPRESENTATIVES,
Washington, D. C., January 27, 1905.

STATEMENT OF COL. C. R. EDWARDS.

The next table shows comparatively the exportations of sugar from the Philippine Islands during the calendar years 1865 to 1904 to the United States, to other countries, and the total exports.

The figures pertaining to Spanish administration were compiled from Spanish commercial statistics published from year to year by the Spanish Government. Those for the years of American administration are according to returns of the present customs service at Manila, published in the Monthly Summary of Commerce of the Philippine Islands by the Bureau of Insular Affairs, War Department.

Exportations of sugar from the Philippine Islands during the calendar years 1865-1904.

[Data for years 1865 to 1894 compiled from official returns of the Spanish Government; for 1895 to 1899 from official returns of the United States Agricultural Department; for 1899 to 1904 from official returns of the Insular Bureau.]

Calendar year—	Exported to United States.	Exported to other countries.	Total.
	<i>Tons.</i>	<i>Tons.</i>	<i>Tons.</i>
1865.....	12,492	42,686	55,177
1866.....	13,669	41,237	54,836
1867.....	11,368	53,292	64,660
1868.....	14,354	59,727	74,081
1869.....	29,044	39,765	68,809
1870.....	23,140	55,073	78,213
1871.....	40,361	47,104	87,465
1872.....	32,219	63,307	95,526
1873.....	35,821	53,516	89,337
1874.....	51,216	52,645	103,861
1865-1874.....	263,514	508,351	771,865
1875.....	53,549	72,650	126,199
1876.....	78,533	51,898	130,431
1877.....	64,602	58,094	122,796
1878.....	63,902	54,081	117,983
1879.....	56,076	78,729	134,805
1880.....	100,480	77,495	177,955
1881.....	77,649	127,423	205,077
1882.....	77,573	70,163	147,736
1883.....	125,170	68,149	193,319
1884.....	83,652	36,295	119,947
1875-1884.....	781,256	694,932	1,476,188
1885.....	132,641	67,935	200,576
1886.....	115,058	66,579	181,637
1887.....	109,451	58,254	167,705
1888.....	82,224	75,569	158,113
1889.....	123,517	100,873	224,390
1890.....	33,515	108,740	142,255
1891.....	46,001	89,658	135,749
1892.....	45,100	208,124	249,224
1893.....	9,912	246,940	256,852
1894.....	11,256	195,629	206,885
1885-1894.....	708,825	1,213,620	1,922,445

Exportations of sugar from the Philippine Islands during the calendar years 1865-1904—Continued.

Calendar year—	Exported to United States.	Exported to other countries.	Total.
	<i>Tons.</i>	<i>Tons.</i>	<i>Tons.</i>
1865.....	59,615	171,308	230,923
1866.....	96,624	181,289	229,913
1867.....	24,353	177,740	202,093
1868.....	27,907	149,608	177,515
1869.....	21,542	62,929	84,471
1870.....	2,120	62,041	64,161
1871.....	5,143	50,831	55,974
1872.....	5,039	91,909	97,038
1873.....	28,852	55,108	83,960
1874.....	25,489	56,554	82,043
1885-1904.....	298,774	1,009,497	1,308,271
1865-1904.....	2,062,309	3,425,400	5,478,709

* Ten months ending October 31, 1904.

Import duties charged by foreign countries on Philippine sugar.

[The bulk of Philippine sugar exported to foreign countries is credited to Hongkong, Japan, and China. Hongkong is chiefly a port of transshipment. The import duties levied on sugar by Japan and China are given below.]

Japan :

Sugar up to No. 15, exclusive, Dutch standard.....per 100 pounds... \$0.125
 Sugar, refined, from No. 15 to No. 20 Dutch standard.....do..... .58*
 Sugar, refined, above No. 20 Dutch standard.....do..... .61

China :

Sugar, brown, up to No. 10 Dutch standard.....do..... .10
 Sugar, white, No. 10 Dutch standard and over, including cube and refined.....per 100 pounds... .13

Spain :

On sugar from foreign countries.....do..... 7.45
 On sugar from colonial possessions.....do..... 2.94

Payable in paper currency—subject to wide fluctuation.)

On January 19 the Secretary of War cabled to the civil governor as follows :

[Cable sent January 19.]

Cable full details as possible concerning wages * * * and also workmen sugar factories, workmen island of Negros, supply of labor * * * in the island of Negros and sugar-producing provinces; also necessity for importing labor from Panay, Bohol, into Negros and wages paid.

The answer came on the 21st, two days afterwards, as follows :

[Cable received January 21.]

There is no probability of large increase in Negros. Common day laborers on sugar plantations receive 40 centavos and two meals per day. During the time cutting, hauling cane, receive 50 per cent more. Common laborers inside of mills receive 2 to 2½ pesos per week and three meals per day. Sugar makers 1 to 2 pesos per day.

Oriental, Occidental Negros, have enough resident laborers for preparing and planting crops, but need double that number during milling season, which lasts about six months.

Oriental Negros draws its extra supply of labor from Cebu and Bohol; Occidental Negros from Iloilo, Antique, Capiz, and adjacent islands. This source unsatisfactory and unreliable. Crops this year in Negros about one-half highest yield prior to revolution. While conditions are slowly improving, it is hardly probable former production will again be reached for several years, on account of the scarcity of draft animals, lack of labor, and other causes.

Mr. WATSON. How much is a centavo?

Colonel EDWARDS. It is half of our cent. In all these statements you can just divide by two to get the values in gold.

Mr. WATSON. They get 20 cents a day, then, and two meals?

Colonel EDWARDS. Yes, sir. Some gentlemen of the committee asked the question, What are the average interisland freight rates to shipping points? The following cablegram was sent to get that information:

[Cablegram sent January 23.]

What are the average interisland sugar freight rates to shipping points; for instance, Manila, Iloilo, Cebu, as well as exporters' prices sugar at these points? What are the average through freight rates San Francisco and New York? Also tobacco? Rush answer by cable.

On the 25th the following cablegram was received in reply:

[Cablegram received January 25.]

With reference to your telegram of 23d, average interisland sugar freight rates to shipping points are .25 pesos (\$0.1250) a picul (137½ pounds); cost of placing sugar at original shipping point and handling at the port of exportation probably one-half peso additional. Exporters' prices at shipping points approximately 7 pesos (\$3.50) a picul (137½ pounds). Through freight rates New York average 10½ pesos ton. Nominal rates San Francisco 10; none shipped that route.

Mr. WILLIAMS. In that connection, just one more question. You spoke of the two or three meals per day. Do you know what those meals consist of that are furnished to the laborers?

Colonel EDWARDS. The principal component is rice, and the second component is fish. From analogy of the experience of the Manila Tramway Company, which is just completing that large tramway, I should judge that the very least cost would be 5 cents a meal, because they have adopted the unusual expedient of furnishing to their laborers, right in their working parties on the track, a lunch every day. They figure that that lunch is a good investment. It not only puts additional fuel into them and makes them satisfied, but its cost is only, as the manager told me the other day, a little over 5-cents a meal, that is, when they buy the material in large quantities and serve it in that way.

Mr. WILLIAMS. They have to buy the material by retail?

Colonel EDWARDS. They buy it by wholesale, I assume. This is a large corporation, working several thousand laborers, and they get it down to a smaller cost than one generally could.

Mr. WILLIAMS. It would probably cost 20 per cent more, or 6 cents, if they had to buy the components by retail?

Colonel EDWARDS. Probably; yes, sir.

Mr. WILLIAMS. These freight rates that you speak of, were they for cargo lots?

Colonel EDWARDS. Yes, sir.

Mr. WATSON. When you say 5 cents a meal, you mean 5 cents in their silver?

Colonel EDWARDS. No, sir; 5 cents gold.

Mr. WATSON. Gold?

Colonel EDWARDS. Yes, sir. We always use the word "pesos" there to denote silver, and a "centavo" signifies their money, but when we use the word "cents" it refers to United States cents.

STATEMENT OF COL. GEORGE R. COLTON.

I have here, gentlemen of the committee, an original Filipino document. It was originally written in the Spanish language under the direction of the Filipino president of the Iloilo Chamber of Commerce, and it is therefore in Spanish composition. A translation has been made, and if it is the desire that I should read the petition I will do so.

The CHAIRMAN. You might read enough to show the object of the petition.

Colonel COLTON. Very well, I will do so [reading]:

ILOILO CHAMBER OF COMMERCE AND AGRICULTURE,

November 26, 1904.

To the Congress of the United States of America:

The Iloilo Chamber of Commerce and Agriculture, representing the sugar-cane growers of this American territory, respectfully requests that the customs tax

now imposed upon Philippine sugar, when shipped to the mainland territory of the United States, be wholly removed, and begs to submit the following statement regarding the condition of the sugar industry in these islands and the necessities for the action requested:

The present situation of the sugar district is extremely discouraging, due to the bad crops of sugar harvested since 1898, and this condition, unless reckoning upon the abolition of the Dingley tariff, unfortunately will not improve, as, though the causes (war, revolution, rinderpest, etc.) which originally brought about the actual depression have disappeared, and apart from the critical financial condition of the planter, which prevents him from properly cultivating his estates, everything has become so dear that the cultivation of sugar cane does not even give him a sufficiency to cover his living expenses.

Before going into the reasons why we consider the abolition of the Dingley tariff upon Philippine sugar as the only measure, in our judgment, to prevent the total ruin of these provinces, we shall make estimate of what the production of the sugar costs. We will base our estimate on the expenses of an estate producing 4,000 to 5,000 piculs, or, say, from 250 to 312 tons, having chosen such an estate, as they are the most numerous. For the production of said quantity of sugar, plantings on an extension of about 125 acres are needed. The cost is as follows, taken from to-day's ruling prices:

	Philippine currency.
Plowing 125 acres ready to plant.....	₱ 625. 00
Cleaning drains before planting.....	145. 00
Planting 125 acres.....	675. 00
Plowing four times between plants.....	430. 00
Weeding and cleaning cane three times.....	850. 00
Cleaning drains after cane has grown up.....	145. 00
Cutting and transporting cane to mill.....	1, 718. 75
Making the sugar.....	2, 313. 00
Packing and mats.....	770. 00
Lime, oil, tallow, petroleum, etc.....	267. 00
Firewood.....	900. 00
Carting, freight, and delivering expenses.....	2, 250. 00
Salaries.....	2, 760. 00
Unforeseen expenses.....	650. 00
Rent (say depreciation, taxes, and repairs).....	2, 000. 00
Interest at 8 per cent per annum on expenses.....	430. 00
Total.....	16, 928. 75

We have taken into account 50 cents per picul for carting, freight to Iloilo, and delivering expenses as a low average.

One hundred and twenty-five acres of good land, as we have already said, produce, under normal circumstances, from 4,000 to 5,000 piculs, or 250 to 312 tons; say, 4,500 piculs (281½ tons) as the average. We can not take into account a price higher than ₱4 per picul, or ₱64 per ton, though, as it is true that it can be higher, as it is just at the present moment, it can also be lower, as it happened last crop, when a large proportion of same was sold at 3.50 to 3.87½ Pfs. Mexican per picul.

We obtain thus ₱18,000 for the 4,500 piculs, and if we deduct therefrom the ₱16,928.75, cost of its production (1 ton, at ₱60.18), we have a balance remaining of ₱1,071.25, or \$535.62 United States currency, for replacing cattle (costing to-day ₱100 to ₱145 each) and for the living expenses of the planter. This is under favorable circumstances, but should they be the reverse, such as drought, excessive rain, or locust, then the results are disastrous. How many planters saw their last crop dried up and then the shriveled cane eaten by locusts.

It can not be wondered, then, that the crops which in 1897 and preceding years amounted to 150,000 tons and more should have diminished to about 80,000 tons in the past year, while the prospective crop is only estimated at 65,000 tons. That to follow in all probability will be an equal percentage smaller. Thus gradually an industry fostered by the late Spanish Government will be dead within four to five years.

It may be asked, If the cane planters have experienced such bad results, why have they not grown something else? We will suppose that the planters should be willing to lose the millions of dollars now invested in machinery in Panay and Negros, and that, though the cultivation of sugar before all other work is

eminently more suitable to the constitution of the Filipino, they would be willing to change sugar growing for any other product, to what other product could they turn their attention? As cotton, coffee, cocoa, and tea can not be thought of on account of the local climatic conditions, there only remain hemp, copra, and rice. In some few specially selected parts hemp is growing and being extended all possible; sea-beach land might be more taken advantage of for growing copra, and the lowlands in the interior of Panay and Negros dedicated to rice, but what is to become of the rest of the lands now dedicated to sugar cane? Forcibly they would be fallow. In such an event what would become of the 700,000 people now living by the sugar industry? What means can be provided for them? And, further, by what other means could the landowner provide his government taxes?

* * * * *

Those interested in American sugar may rest tranquil on this score and have no fear of Philippine competition, which seems to be the terrifying but delusive dream that haunts them. In the Visayas there is a great scarcity of laborers. At the time crops were 150,000 tons a good many planters were greatly pushed to obtain the necessary labor. The scarcity of labor is to-day more serious, owing to the late revolutions, cholera, fevers, and—why should we not say it?—on account of famine. For these reasons, as long as the population of the Visayas does not increase considerably, we are sure that the production of sugar can not surpass a limit of 175,000 tons, the government forbidding us to look elsewhere for laborers. This is on one side; on the other we have open to us the Chinese markets.

Formerly sugar was unknown in the interior of China, and less than twenty years ago the only sugar exported from here to China went to the Hongkong refineries to be refined and reexported to Australia. This has changed; to-day our sugars, owing to their late cheapness, have been introduced by Chinese merchants into the interior of China, where it is consumed in its raw state and is now a yearly increasing domestic necessity, as confirmed by statistics. If we compare China with Japan, where twenty years ago sugar was almost unknown and which now possesses important refineries, we are certain that China will also quickly have its refining centers, when all the sugar we could possibly produce will not suffice their wants. The abolishment of the Dingley tariff would raise our basis for sales to Chinese markets and oblige the Chinese merchants, who know that by paying a little over European values they can secure our sugar, to pay the full value for it. At equal prices there can be no doubt that Philippine sugars will go to near-by China, where they are sold on color and not on polarization, and where the seller is not exposed to any claims even in falling markets.

* * * * *

Respectfully submitted.

RAYMUNDO MELLIZA,
Angulo, President Iloilo Chamber of Commerce and Agriculture.

The CHAIRMAN. There is a certain item that you named in the beginning of that petition that ought not to be counted in more than once in every seven to fifteen years, is there not—the planting and draining?

Colonel COLTON. No, sir; it is every year.

Mr. CLARK. They do not plant sugar cane every year, do they?

Colonel COLTON. Yes, sir; in the Philippine Islands.

Mr. CLARK. Why, somebody testified here the other day that they did not plant the sugar cane but once in every seven to fifteen years.

Colonel COLTON. That is a great mistake, sir.

The CHAIRMAN. Do you know that of your own knowledge?

Colonel COLTON. Yes, sir. It is planted every year.

Mr. CLARK. We want to get the straight of it.

Colonel COLTON. I do not mean to say but that the sugar cane might grow if it was not planted every year, but they plant it every year, as a matter of fact.

* * * * *

Colonel COLTON. The natural market for the Philippine sugar is China, and to that market it will go, but at the price fixed by competition.

Twenty years ago sugar was unknown in the interior of China, and the small quantity shown by statistics to have been shipped there was refined in Hongkong and reexported to Australia and elsewhere. During recent years, however, owing to the fact that no profitable market has been open to Philippine

sugar, Chinese merchants have taken it in continually increasing quantities, but at a sacrifice to the producers, and gradually introduced the use of it among their people until it has become a commonly known commodity and domestic necessity in that country.

The consumption of sugar in China, like that of flour, is increasing so rapidly that the possibilities of the future are incalculable. Flour importations have increased tenfold in ten years and there seems no limit to the amount those countless millions will be able to consume. This is true of any foodstuff which is well received by the Chinese people and the price of which can be kept in reach of either the masses or the middle classes.

Ten years ago the Philippines sent but little sugar to China for consumption, but during the last few years of unfortunate market conditions China has become the dumping ground for that unprofitable product, where it is consumed in its raw state.

The trouble with the Philippine sugar industry is not a lack of near-by consumers, but the low price at which the product must be sold. The shrewd Chinese merchant is not apt to pay more for a product than it is worth in the markets of the world. He knows perfectly well that by offering the equivalent or even a little less than European or American values, whichever happens to be the higher, taking into consideration the difference in freight and other expenses attending long shipments, he will be able to buy the Philippine sugar, because his market is within four days' sailing from the Philippines, settlements are more easily, quickly, and always more satisfactorily made, and, most important of all, he is compelled to ask no questions about polarization, as sugar is sold and bought in China entirely upon its color.

The absence of thrift or industrial habits, which generally characterizes the Filipino laboring classes, renders it exceedingly difficult to largely increase the production of any article dependent upon manual labor. An increased wage does not always insure greater industry. It is as likely to suggest fewer working days to earn the necessary amount to sustain life.

There was a long period when the production of sugar in the Philippines yielded large profit, and planters exerted every effort to increase their output to the utmost extent; but owing to the labor condition outlined they were never able to force the production much beyond the normal crop of from 100,000 to 150,000 tons.

One of our most serious difficulties in treating with the Filipino people has been, and undoubtedly will continue to be, the lack of any real conception of oriental, and particularly Malay, character. The laboring classes are generally what we should call improvident. They live for the day and let to-morrow take care of itself. They do not see any need of acquiring a competence, and savings banks are unknown. The tropical climate and local conditions are largely responsible for this. In ordinary years no serious effort on their part is required to maintain themselves according to their customs in comfortable estate. Therefore the great majority of them decline to work, even when the opportunity is offered, and stolidly take the consequences of their lack of thrift as the times change. The Visayans, however, who inhabit the sugar-producing islands, have learned more industrious habits through pressure by the native sugar planters, and now depend almost entirely upon the occupation which the sugar industry affords as a means of livelihood. But it is to these people alone, whose working capacity has now been fully developed and is known, that the planters must look for their labor, for, owing to race prejudice and the lack of desire to work, it has been, and will always be, impossible to induce natives of other islands to enter the Visayas or assist in the work.

From personal observation of the conditions and a careful study of the people engaged in producing sugar in the Philippines during a residence there covering the period of American occupation, I am firmly of the opinion, as all agree who have studied the question on the ground, that an increased price for the product, which might be brought about by the competition that would be furnished by the removal of the customs tax in this country, would only result in a return to the normal production attained in years past when the market conditions have been favorable. Further extension of the industry can only occur very gradually through an increase in the population of the sugar-producing islands or the importation of cool labor, which is prohibited.

[From same hearings, p. 178.]

[From report of investigations in the islands of Cebu and Negros with the view to the selection of a site for a model sugar estate, by Oswald A. Steven. (Report of the Philippine Commission, p. 633.)]

Upon receipt of my commission as special agent of the Interior Department, dated February 10, 1902, and also your letter of instructions, dated February 11, 1902, I proceeded, as per your instructions, to the islands of Cebu and Negros for the purposes of examining lands on these two islands and to select a suitable site for a model sugar-estate experimental farm, and later, as per your telegram, to combine therewith an industrial school. * * *

Sugar.—The tendency of the sugar planter in the Philippines is to grow sugar on the low, level lands, where the soil is largely the same over the entire islands—namely, a black, heavy soil or a brown loam. With an abundance of level land the planter has not been compelled to cultivate the higher mountain lands nor a different soil from that he is conversant with, but immediately following the natural increase in the cultivation of lands to sugar, from modern methods of agriculture and machinery, demonstrating the immense profits from the proper cultivation of sugar, these other soils and elevations will be brought under cultivation, and a cane seed especially adapted for such soil or elevation will have to be primarily grown by the experimental station, and hence the actual necessity for varied soils and elevations.

[Pages 634, 635:] Adjoining and in the vicinity of a model sugar estate there should be enough farms now raising sugar whose cane could be ground at the model mill, the returns from which, being carried to the credit of the mill, would pay off the indebtedness of the mill and farm in five and a half years at present prices of sugar and under present conditions.

These mentioned requirements, together with the fact of suitable soil as to quality and depth, is what I am certain is necessary to the site upon which is built a model sugar mill and experimental station.

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[From same hearings, p. 185.]

COMMITTEE ON WAYS AND MEANS,
HOUSE OF REPRESENTATIVES,
Washington, D. C., January 28, 1905.

STATEMENT OF HON. WILLIAM H. TAFT, SECRETARY OF WAR.

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There is another industry that for some years has exported more of value than the sugar industry. That is the cocoanut industry, and the trees are being planted all over the islands, because after six years of waiting a cocoanut tree becomes a capital for a hundred years. A cocoanut tree after six years will produce enough to rent for from about a peso (Mexican) to a peso and a half, and without any cultivation at all. And that, I may say, suits the native workman and the native capitalist exactly. All he has to do is to sit down and wait for these cocoanuts to grow, and the only labor connected with it is the clearing of the weeds from the bottom of the trees and the collection of the nuts from the tops of the trees. The cocoanut does not grow in all soils, but it grows very well along the seashore and along the lake shore, and in some provinces, for instance in the province of Laguna, which is a rich province and has a good deal of sugar and rice land, the extension of the cocoanut industry has been so great that the cultivation of sugar and rice have practically faded out. That is not so true of the rice as of the sugar.

The CHAIRMAN. Will the cocoanut grow on the same land that sugar grows on?

Secretary TAFT. High land sugar?

The CHAIRMAN. Yes.

Secretary TAFT. Yes, sir; it will. Then there are other industries, as mentioned here. There are the rubber industry and the cacao industry as well as others, and then there is, in the islands, growing wild, camphor, the world's supply of which is at present produced almost entirely in the island of Formosa. We have the wild camphor tree in the northern part of the islands, and we are quite hopeful that that may be developed into an industry; and because of the few places in which it can be grown that it will become a valuable industry.

We are not confined to sugar or tobacco, and we do not think that either—though we are quite agreed they are important industries in the islands—ought to be stamped out deliberately.

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With respect to the sugar of the Philippine Islands, Negros is the great province for the raising of sugar, but a large part of that province is mountainous, and the southern half of it—certainly the southern third of it—is an impenetrable wilderness. It is something that for years can not be changed into anything other than a forest out of which timber is to be drawn.

The other province in which sugar is raised is Pampanga, in Luzon, and then some is raised in Cavite and some in Laguna. But the stimulation in respect to sugar will be almost wholly within the provinces of Negros and Pampanga, I ought to have mentioned the province of Iloilo, in Panay; and possibly some would be raised in Cebu. I ought also to make my remarks apply only to the province of Occidental Negros, for Oriental Negros, which is on the eastern side of the mountains, produces comparatively little sugar and is devoted much more largely to hemp and rice; and wherever hemp goes, everything else moves out.

The question is asked what it would cost to turn other lands into sugar lands. I am unable to give anything on that except to say what sugar land is worth. It is worth from \$20 to \$40 an acre, and uncultivated land in Spanish times was sold at \$5 a hectare, or about \$2 an acre; and I assume that the cost of clearing lands may be determined somewhat by the difference between the price of uncultivated land and the price of cultivated land, although of course that is not an accurate method of determination.

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Mr. CLARK. As to the machinery that is used in preparing the sugar, is that equal in any way to the machinery used by the Louisiana plantations, do you suppose?

Secretary TAFT. No, sir.

Mr. CLARK. How much would it cost to substitute American machinery with the present production of cane? Would it increase it as much as one-fourth, do you suppose?

Secretary TAFT. I think it might. I think perhaps it might increase it more. My idea is—I want to be frank—that the sugar fields of the Philippines Islands can produce, if treated in the same way, as much as Cuba can; that is, I mean if you have the same modern machinery and the same treatment.

Mr. WILLIAMS. As much per acre?

Secretary TAFT. Yes, sir; per acre. I am not quite sure. I am not well advised about the machinery necessary. I understand that it takes about a million dollars to produce 15,000 tons a year. I mean the machinery plant would cost about that much. The soil in the Philippine Islands adapted to sugar, I fancy, is just about as rich for sugar purposes as the soil in Cuba; that is, that soil that is adapted to sugar is. Of course it is a good deal farther away, and for that reason the risk of investment is considerably greater.

Mr. COOPER, of Texas. What percentage of the area of the islands do you think is adapted to sugar?

Secretary TAFT. I should doubt whether any more than the provinces I have mentioned—Negros, Pampanga, and Iloilo—would be likely to be devoted to sugar.

Mr. COOPER, of Texas. In acres how much would that amount to?

Secretary TAFT. I could not tell you that. A great deal of all of those provinces is in hill land and in forest. It is not so in Pampanga. Pampanga has sugar and also rice. But there is a good deal of swamp land in that province which is adapted to nothing but the growth of the nipa palm, from which is produced the "vino" or the whisky of the islands. In the height of the sugar industry in the islands there may have been 400,000 acres under cultivation. I do not suppose that to-day there are more than 200,000 acres under cultivation.

I am not sure about that, but that is a guess founded on a statement made some years ago by an English consul who went over the island to investigate and made a report as to the number of hectares then in cultivation. That was made in 1888. The acreage since 1893 has become less. When sugar land or any other land is allowed to lie fallow and idle, there comes into it the cogon grass or weed, which grows to a height of 12 or 15 feet, and its eradication is a work of great difficulty and cost. The sugar development of the islands will be necessarily in the direction of clearing that which was old sugar land until it is all exhausted.

The limitation of labor upon the amount of land which it would be profitable to cultivate is the most serious one, and it is the one which completely destroys all the supposition that there is to be an enormous extension of the sugar production there.

Mr. WATSON. Do you know whether or not they have ever tried in the provinces to cultivate the sugar beet?

Secretary TAFT. No, sir; I do not think they have. I do not mean to say that there are not other provinces than those I have mentioned in which there is sugar grown. It is grown in every province. But I have been speaking of sugar for exportation. It is grown in other provinces, as I suppose that it can be grown in all parts of the Tropics; but it is grown there for food purposes. People eat the sugar cane. That is the case largely in the Ilocos provinces. The Ilocos provinces have more tobacco than they have sugar, and it is not very wise to grow tobacco and sugar in close proximity, for the reason that the sugar with its sweetness attracts all sorts of insects and worms, and the tobacco crop is very much injured by the presence of them.

If I understood the argument here it was that we were to have 50,000,000 acres of sugar at 5 tons to the acre, and 50,000,000 acres of tobacco at 2,000 pounds to the acre. I do not know where they were going to put it. I suppose they were going to overlap each other in producing this enormous quantity that was to swamp the industries of this country.

Mr. WILLIAMS. Do the Philippines now export or import foodstuffs, upon the whole—how is the balance?

Secretary TAFT. For upward of ten years, I should say—five years before we went there and five years since—we have imported rice into the islands. But that importation has increased in the last three years with great rapidity, due to the very disastrous conditions of agriculture. You know the rinderpest carried off from 75 to 90 per cent of the cattle; that is, the carabao—the water buffalo.

The Filipino knows no other method of cultivating rice than by constructing a rice paddy with a dike around the field. Then he plants the rice in a little corner and waits until the rain comes to make a pond or muck inside the dike. Then he plows, not in the dry but in the wet, in the mud, and the water buffalo is almost an amphibious animal and is able to stand the strain. He is almost webfooted. The plowing is done with a light plow hardly heavier than a big stick and with the buffalo. Then, after the field is plowed, the natives go in in their bare feet, sometimes to music and sometimes not, and plant each rice plant separately.

Now, the destruction of the carabao, you can see, very seriously interferes with the production of rice, and that increases the necessity for its importation. So that last year there was an importation of \$15,000,000 worth of rice. I am told by a cable from General Wright, and I also learn from the reports, that the rice crop this year in the islands is better than it has been at any time since the American occupation, and I am very hopeful that that importation of rice will be considerably reduced. But before the rinderpest and the war the importation of rice could not be attributed to a failure of the carabao, because the carabao was there. I presume that it was due to the change from the cultivation of rice in the southern provinces to the cultivation of hemp. Hemp became so much more profitable that they preferred to cultivate the hemp and buy the rice, and therefore, although there are a number of unoccupied tracts of land that would be available for rice culture, the supply of labor was not sufficiently great, or the energy of the people was not sufficiently great, to raise both their food products and hemp, so that they raised the hemp and bought the rice.

Mr. GROSVENOR. They bought more rice than they sold hemp by about \$2,000,000.

Secretary TAFT. No, sir; the hemp was \$21,000,000.

Mr. GROSVENOR. I thought it was only \$13,000,000.

Secretary TAFT. No; you are thinking of the hemp imported into this country?

Mr. GROSVENOR. Yes, I am; that is right.

Mr. CLARK. What do they use to drive out there?

Secretary TAFT. The carabao. They have ponies, but the carabao is the mainstay. They have cattle, and they sometimes use what they call trotting bulls, and put them into a little buggy, a little carramata, but they ordinarily drive with the carramata a pony, and for drawing heavy loads they use the water buffalo, the carabao.

Mr. CLARK. Do they eat any meat over there?

Secretary TAFT. They eat carabao meat sometimes. They eat more fish than meat. There used to be a good deal more meat eaten than now, because not only the carabao were affected by this rinderpest, but great herds of cattle, like the Indian cattle, bulls and cows, on the island of Masbate and other ranges were swept from the islands. They are gradually being restored by nature. Enough were left to found the race again, and in the course of ten years I hope that there will be a great supply of beef cattle there.

Now, the people live on rice, or on rice and fish mixed together. The fish, if a little touched, strikes the ordinary Filipino with the same degree of pleasure with which the canvasback duck that is a little offensive strikes the gourmand on this side. They do not mind fish a little old. They also have camotes, or sweet potatoes, which grow rapidly and make a fairly good food, although they are rather indigestible and lead to stomach troubles. Rice is the best food that they have.

Mr WILLIAMS. What I was trying to get at was whether, from the density of population of the Philippines, a great quantity of the land will not always be required to raise food for the people?

Secretary TAFT. It ought to be; yes, sir. The evidence taken with respect to the price of the friars' lands—and this is in one of the reports of the Commission which I will submit to the committee—is to the effect that in Bulacan and Cavite and Manila, according to the opinion expressed by the expert, the cultivation of rice was more profitable than the cultivation of sugar, and those provinces are not especially sugar provinces as Pampanga is and as Negros is.

[From Senate Document No. 277, Fifty-ninth Congress, first session, hearings before the Committee on the Philippines, of the United States Senate, p. 217. Reprint public hearings in Manila, P. I., August 7, 1905.]

**STATEMENT OF MR. LEON MIGUEL HERAS, OF FLORIDA BLANCA,
PAMPANGA.**

**PRINCIPAL CAUSES OF THE DECLINE IN THE CULTIVATION OF SUGAR CANE IN THE
PHILIPPINES AND THE PRESENT CONDITIONS OF SAME IN THE PROVINCE OF PAM-
PANGA.**

Capital.—The great scarcity of money is the principal cause of the precarious condition of those engaged in the cultivation of sugar cane, and it can almost be affirmed that 90 per cent of the planters in the province depend upon Chinese buyers, who never advance money except at a rate of interest fluctuating between 20 and 40 per cent. This statement makes it easy to understand that it is impossible for the industry to prosper, having such interest to pay and selling the sugar at prices as low as the prevailing ones.

Cattle.—The great scarcity of cattle is another of the principal causes preventing the revival of agriculture in the Philippines, for the diseases that have decimated work cattle not only have not disappeared but have increased, as investigation will prove.

The difficulties with which the planter has to contend increase when we take into consideration the customs and manner of being of our rural population, unaccustomed to use the class of work animals employed in other countries, for which reason the carabao can not at the present time be substituted. For example, it has been attempted to employ oxen imported from China, with negative results, 60 or 80 per cent having died soon after importation.

The share system in the cultivation of land.—One of the greatest disadvantages of the Philippine planter consists in the manner in which the land is worked, this being done in very unfavorable conditions, due in the first place to our tropical climate and to the few wants of our rural population.

Laborers.—The labor used in the manufacture of sugar is very high priced at present, owing to the increased price of staple articles and, as has been stated, to the loss of work cattle, resulting in a large reduction in the area under cultivation. A large number of the laboring people, always scarce, have gone to Manila in search of work not to be had in the province, and owing to this great scarcity planters have now to pay treble and even quadruple the old wages.

It is well to note that this scarcity of laborers is due in a large measure to the custom among the great majority of our working people of not desiring to change their place of residence for any length of time. It is for this reason that, in spite of the lapse of a great number of years, no plantation in the province has produced more than 10,000 pilones—that is to say, about 680 tons—95 per cent of the planters producing only from 20 to 200 tons.

To prove the scarcity of hands and that our working people are not inclined to emigrate, the fact can be cited that in the hemp districts a laborer can earn as high as ₱5 a day (\$2.50, gold), and that, notwithstanding this large wage, people in other provinces have, up to the present time, not been known to go to those districts to work.

Risks.—Many and varied are the risks in this class of cultivation that can not be foreseen, much less controlled, such as fires, floods, droughts, and locusts; from this last calamity the province has suffered for three consecutive years.

Production.—Owing to the imperfections of our machinery and system, it is estimated that there is a loss of from 20 to 30 per cent more than in other

countries using modern machinery. Aside from this loss in the quantity produced, there is a loss in quality on account of the imperfection of our product.

No favorable change can be expected in this particular for many years, on account of the reasons above stated, to wit, lack of capital, cattle, and labor.

Transportation.—The means of transportation existing at present—and we suppose that conditions are alike in this respect in the other provinces of the archipelago—can only be used during four or five months of the year—that is to say, during the dry season. For this reason the cost of transportation in some places amounts to 30 per cent of the value of the articles transported.

Internal revenue.—The imposition of this tax has made the situation of the sugar planters in our province still worse, resulting in a loss to us of from 25 to 30 per cent of our product, as prior to its enactment we sold our molasses to alcohol distillers at from ₱1 to ₱1.60 a 4-gallon can, while now we get only ₱0.20 to ₱0.30 for the same amount.

Reduction in the total production.—A great reduction has been noted in the area planted, owing undoubtedly to the causes above mentioned, as in the provinces like the two Ilocos, La Laguna, Batangas, and others, formerly producers on a large scale, planters have substituted maguey, hemp, cocoanuts, etc., which give better results.

When the provinces mentioned were large sugar producers the total yield for the islands reached 300,000 tons, which figure has been steadily decreasing, production having fallen off to its present miserable condition.

Markets.—The largest and most natural markets for Philippine sugar at present are the countries of China and Japan, now the largest consumers of our product, and owing to this favorable condition Chinese buyers, having no competitors, obtain our sugar at their own prices and therefore are able to impose their own terms.

According to approximate figures from the Philippine bureau of agriculture the total area of the archipelago is 73,000,000 acres, of which 50,000,000 acres are forest and mountain lands, and of the 23,000,000 remaining only 3,200,000 are cultivated to all crops as follows: Sugar, 180,000; rice, 1,600,000; tobacco, 80,000; sweet potatoes, 60,000; plantains, 85,000; hemp, 550,000; cocoanuts, 375,000; corn, 267,000.

It is seen from the above figures that 180,000 acres being cultivated to sugar and 2,200 pounds being the average yield per acre, we have a total production for the entire country of 180,000 tons of sugar. Admitting that after many years the production shall have doubled—which appears improbable—it would have reached only 360,000. Now, if we deduct 80,000 tons, which is approximately the amount consumed in the islands, but 280,000 tons would remain for exportation.

According to the statistics the amount of sugar imported into the United States for home consumption is nearly 2,000,000 tons; admitting that the archipelago should produce the 280,000 tons mentioned, there would still remain a shortage of some 1,700,000 tons, and we can not understand how our production, if permitted free entry into the United States, could harm the interests of sugar producers in the sovereign country.

In asking for the abolishment of the duty on our sugar imported into the United States we do so principally for the purpose of securing better prices from our present consumers, the Chinese and Japanese, inasmuch as, by having another market for our sugar, they could not impose their prices on us.

If present prices continue it is not too much to predict the total ruin of the industry at a not far distant date, as is proven by the following figures:

Cost of production of 2,000 pilones of 150 pounds each—that is to say, of 136 tons.

272 acres, at ₱58.179 per acre.....	₱15, 824. 68
Machinery, warehouse, buildings, etc.....	7, 000. 00
80 work carabaos, at ₱160.....	12, 800. 00
40 native plows, at ₱6.....	240. 00
10 carts, at ₱60.....	600. 00
Total.....	36, 464. 68

Annual expenses.

1 plantation overseer.....	₱1, 200. 00
Wages of hands.....	2, 000. 00
Mortality of cattle, 20 per cent of ₱12,800.....	2, 560. 00
Land tax.....	131. 25
Wear and tear of plows, 50 per cent.....	120. 00
Wear and tear of machinery, etc., 15 per cent.....	1, 050. 00
Wear and tear of carts, 25 per cent.....	150. 00
Cost of manufacture, at ₱1.51.....	3, 020. 00
Hauling to warehouse, at ₱0.30.....	600. 00
Interest on capital, ₱36,464.68, at 10 per cent.....	3, 646. 47
Total.....	14, 477. 72

An average of ₱7.24 cost per pylon, or ₱106.45 per ton.

The average prices during many years have been between ₱3.50 and ₱5 a pylon, which proves the assertion made in the foregoing paragraph.

If the plantations that are still being worked have been able to keep up it is because the owners have not suffered the total loss of their animals. Those that have had the misfortune to lose them have been compelled to suspend all work on their lands, as has happened in the plantations of La Laguna, Ilocos, Batangas, Bataan, and other places.

Senator FOSTER. Will you please ask the speaker how often it is necessary to replant the cane?

Commissioner LUZURIAGA. We have to do so every year; our lands are not as rich as those in the island of Cuba, and therefore we are obliged to plant yearly.

Senator FOSTER. Ask him if the cane is not ratooned for one, two, or three years.

Commissioner LUZURIAGA. It is very rare in the island of Negros to get a ratoon crop. I know of one or two exceptions where they have been able to do so, but they have found great difficulty in trying to get a third crop, and it does not pay for the labor necessary to gather it. The lands upon which this can be done, furthermore, are considered very valuable and are very high priced and very rare.

Senator FOSTER. What proportion of the crop does it require to replant?

Commissioner LUZURIAGA. About 80 per cent has to be replanted every year.

Senator FOSTER. But what proportion of the original crop is required to replant the same acreage from which it came?

Commissioner LUZURIAGA. The practice in the Philippine Islands with respect to replanting is to cut off the last section of the cane, the tops, which are placed in germinating beds and then replanted; that is the practice here; they take the topmost part of the stalks and plant them.

Senator FOSTER. How many pounds of cane can you get from your new land?

Commissioner LUZURIAGA. The average is 1 ton of sugar per acre. There are exceptions; sometimes newly cultivated land—fresh land—will produce more, but the general average is 1 ton of sugar per acre.

Senator FOSTER. How many tons of cane per acre?

Commissioner LUZURIAGA. It is not the practice here to weigh the cane; I can not answer that question. Agriculture in these islands has not reached that point of perfection; I do not know of any farmer who weighs his cane. This fact will forcibly demonstrate to the gentlemen of the delegation the backward state of agriculture and this industry as conducted in the Philippine Islands.

Senator FOSTER. Is it necessary to use fertilizers or irrigation on the land?

Commissioner LUZURIAGA. No, sir; neither one nor the other.

Secretary TAFT. Senator, will you ask him if that is true in all the provinces?

Senator FOSTER. Yes, sir. Does that apply everywhere?

(Señor Leon Miguel Heras, a planter from the province of Pampanga, here arose.)

Señor HERAS. I would like to say in explanation of the statement of Commissioner Luzuriaga that it is not necessary to use fertilizers here; that the reason fertilizers have never been used here is because the people have not been educated up to the use of them. It is not because fertilizers are not required; it simply has never been the practice to use them.

Secretary TAFT. How about irrigation?

Commissioner LUZURIAGA. Irrigation has never been used as yet in the sugar lands, though it is used upon the rice lands sometimes.

Secretary TAFT. But he does not mean to say that they do not use irrigation in Cavite—for instance, on sugar land?

Commissioner LUZURIAGA. Not in the cultivation of sugar; with rice, yes.

Secretary TAFT. Don't they use irrigation in the cultivation of sugar in Pampanga?

Señor HERAS. No, sir; but in Iloilo they do.

Senator FOSTER. What is the average price paid per day for labor by sugar men?

Commissioner LUZURIAGA. Field hands are paid from 40 to 50 centavos per day—that is, 20 to 25 cents, American money—but the laborers used in the mills get nearly double that; besides they are all provided with their food by the planters.

Senator FOSTER. You say that is 25 cents a day, gold?

Commissioner LUZURIAGA. Yes, sir; the field hands get 25 cents, gold, a day and their food.

Senator FOSTER. About what is the cost per day of feeding them?

Señor HERAS. In my province of Pampanga it costs from 20 to 25 centavos per day for the food; the food provided is very inferior in quality and quantity. It is not food for an American or European laborer, nor could an American subsist upon it at all.

Senator FOSTER. How many acres of land can one man cultivate per year?

Commissioner LUZURIAGA. One man can cultivate per year $2\frac{1}{2}$ acres.

Senator FOSTER. You mean cultivate and harvest?

Commissioner LUZURIAGA. No, sir; the work of harvesting is separate from that estimate, and, besides, the man cultivating $2\frac{1}{2}$ acres must have the assistance of a plow and carabao, and in some cases it is necessary for him to have two carabaos in a year to do that work.

Senator FOSTER. One man and two carabaos will cultivate $2\frac{1}{2}$ acres of cane per year?

Commissioner LUZURIAGA. Yes, sir; and in some cases he can do it with one carabao.

Commissioner WORCESTER. Can he also prepare the land for planting and plant it?

Commissioner LUZURIAGA. Yes, sir; that is one man's work; that is equivalent to 1 hectare of land; but what that man can not do is the work of harvesting; this does not include that nor does it count any of the work of cutting the cane and hauling it to the mill; it is simply the work of cultivation; that is all.

Senator FOSTER. What are your sugar-making months—the period in which the cane is manufactured?

Commissioner LUZURIAGA. From December to March or April.

Senator FOSTER. When do you plant the cane?

Commissioner LUZURIAGA. The same months are the months for planting for the reason that it is our custom to use the top of each stalk for replanting.

Senator FOSTER. Do you know the largest sugar-producing plantation in the islands; and if so, what is the productive capacity of sugar per day?

Commissioner LUZURIAGA. Yes, sir; the largest sugar mill in the islands is located at Talisay, in the island of Negros, and is owned by Señor Jocson. This mill will produce, under the above conditions, 300 piculs per day—a picul is $137\frac{1}{4}$ pounds.

(Mr. Welborn, chief of the Philippine Bureau of Agriculture, here arose.)

Mr. WELBORN. Three hundred piculs are equivalent to about 20 short tons, English measure.

Senator FOSTER. That is about 40,000 pounds?

Mr. WELBORN. Yes, sir.

Senator FOSTER. How many men are employed in the field and around the sugarhouse, skilled and unskilled labor, in producing that amount of sugar per day, in such a sugarhouse as that the speaker mentions?

Commissioner LUZURIAGA. Conditions vary so much in different sections that it is difficult to state the exact number of men required to produce that amount of sugar. It depends upon the fertility of the soil, the location of the land, etc., but there are gentlemen here who have estimates of the actual cost of production under different conditions, and they may furnish the information required.

I have the figures here of one sugar estate in the town of Tailsay, in the island of Negros, which I will read if you desire.

The CHAIRMAN. I presume the gentlemen would be glad to hear it.

Commissioner LUZURIAGA. The different conditions under which the sugar crop is raised must be taken into consideration. Planters sometimes administer their own estates, and in that case the number of laborers employed is greater than when it is let out by contract; sometimes contracts are given for the cultivation of certain parts of their land to different men, for a fixed price; then the number of laborers employed is less.

STATEMENT OF PROF. W. C. WELBORN, CHIEF OF THE BUREAU OF AGRICULTURE.

Mr. WELBORN. Before proceeding I promised some gentlemen to give some figures out of the census returns which I got when I went to lunch. The question was as to the size of the sugar estates in the islands.

There are 916 sugar mills in the islands. About one-half of this number are animal-power mills and the other one-half steam mills. Five hundred and sixty-nine of these mills are in the island of Negros, the island which produces perhaps eight-tenths of all the sugar exported from the Philippines, and practically all the rest are on the island of Luzon. Assuming that each mill serves one estate, the estates average for the two islands 176 acres planted to each estate; for Negros 127 acres planted to each estate.

Now, I shall not consume time in arguing the political or legal questions concerning the Philippines and the United States. I am here to testify somewhat as an expert concerning agricultural and business conditions in the islands and at home.

A little sugar is raised in most of the islands, but as a commercial product in only three or four. I find from the census returns recently arrived that Occidental Negros has been producing about eight-tenths of the sugar for export. Only 180,000 acres were planted in cane in 1902 and the average yield was 2,200 pounds per acre—the lowest for either cane or beet sugar made on the face of the earth. The average yield in Occidental Negros was 2,800 pounds per acre. The average yield for Pampanga, the next largest sugar-producing province, was about 1,100 pounds. For 1903 and 1904 I am sure, from personal observation, Negros has fallen off in yield and Pampanga has gained.

I find, in fact, that only 3,200,000 acres of land in the Philippines were cultivated in 1902. One-half of the whole is in rice. One-third of the balance is in hemp, 287,000 acres are in corn, about 375,000 acres are in cocoanuts, and about 80,000 acres only in tobacco.

Most of the land planted in cane in Luzon is poor and sandy, and probably does not average over 1,500 pounds of low-grade sugar per acre. Only one crop is gotten every two years. The land is too poor to grow a ratoon crop and is allowed to lie fallow a year, when it is again plowed up and planted. In the older lands of Negros the same method is used; but on the fresher lands one ratoon crop is often grown—never more—and then the land lies fallow a year.

One reason for low yields and poor quality of product in the Philippines is the very old and poor machinery in use. In Luzon there is nothing larger than a 3-roller mill in use, and I do not exaggerate when I say that at least half of the mills are driven by carabaos. In Negros there is one 5-roller mill of a pattern of twenty-five years ago; all the rest are 3-roller mills, and perhaps average a loss in the total juice of the cane of about 40 per cent. There is not a vacuum pan in the whole Archipelago, and not one pound of centrifugal sugar is made. The cooking is done in the old Jamaica train in vogue in other sugar countries forty years ago. The sugar, molasses, and all are boiled down hard and beaten up with spades and called sugar. It is a brown, lumpy, scorched sugar, polarizing about 84 degrees and containing a large amount of glucose, ash, and other impurities that prevent much of the indicated 84 per cent of sugar from being recovered at the refinery. Scarce and high in price as fuel is in the Philippines, no one has ever attempted to crush cane well enough to burn the bagasse without first sunning it. I have seen fifty men engaged in spreading the bagasse out over an acre of yard, raking it over to dry, and carrying it back to the furnace.

With every other method about the mill and plantation just as crude, and with the period of low prices prevailing for several years past, there is no wonder that the sugar industry has almost starved to death, and with it the laborers working for the proprietors. With the carabao as the draft animal, any great expansion of the industry is impossible. The carabao works half the time and wallows in the mud the other half. He walks half as fast as a horse with a heavy load. With the native plow a man and the carabao will scratch over an acre of land in five days. It never takes less than three of these scratchings (called plowings) to put the land in shape for planting, and it often requires five. In order to grow 1,000 acres of cane, 400 carabao must be kept and 400 acres of land used for grazing them. Since the surra and rinderpest and other contagious diseases have become prevalent in the islands it is impossible to keep even 100 carabaos bunched together without disease cleaning out the whole of them, perhaps before a single crop can be grown and harvested. In making sugar in a tropical country planting must, of course, go on with the harvesting and grinding. Notwithstanding the ridicule the American sugar men offered Colonel Colton's statement—that the cane is planted once a year and cut at twelve months of age—such is the truth and the whole truth.

So, at the present time, the mills in the islands—many of them now twenty to thirty years old—are becoming worse and worse worn, the mill buildings are falling down, and the people are without money and without credit to renew them. They do, it is true, get some credit from Chinese, who do a scalping business all over the sugar districts, and, to my own knowledge, have loaned money to planters at 10 per cent a month. When the high prices of the recently passed grinding season came the people were (most of them) not in position to be much benefited. The dealers of Iloilo and the Chinese everywhere knew of the rise in price first and, by making advances to help along the harvesting, contracted for the output at much below its value.

For the years 1887, 1888, and 1889 some three-fourths of all Philippine sugar went to the United States, and the production of that period was substantially twice what it is now. For the year 1902 it seems not a pound of Philippine sugar went to the United States. In 1903 the United States took about 35,000 tons of our low-grade sugar and imported from other foreign countries about 2,000,000 tons of sugar. This importation was exclusive of Hawaii and Porto Rico, which are regarded as United States territory, just as we believe the Philippines ought to be regarded. Philippine sugar, in other words, made up about $1\frac{1}{4}$ per cent of the value of the home country's import of sugar. In 1904 about the same relative showing is made. The mother country, then, seems to be spending 3 cents for sugar from her Philippine colony every time she spends a dollar for Cuban sugar. If the United States took all our sugar, the bill would now amount to just $6\frac{1}{4}$ per cent of what she is spending for this article in Cuba, or just about $3\frac{1}{2}$ per cent of what she is spending in all foreign countries, including Cuba, for sugar. These calculations take into account the low grade of Philippine sugar and its smaller market value.

In the last twenty-five years Louisiana has multiplied her sugar yield by three, counting that the extra large yield given by the last exceptionally favorable season will be kept up. The beet-sugar industry is really less than fifteen years old as an industry, and in that time has attained a production of about a quarter of a million tons of sugar. In the meantime Hawaii and Porto Rico have been added to the United States, with the production of substantially a half million tons. In spite of all this, the United States has multiplied her importation in twenty-five years by more than two. Her consumption of sugar has multiplied by three in the same period of time. Let this rate of increased consumption go on for another quarter of a century, and the home beet-sugar crop may be multiplied by three, the cane-sugar crops of Louisiana, Hawaii, and Porto Rico may multiply by three, and still there would be room for the Philippine crop to multiply by sixty and all go to the United States. It is true we need not expect our home consumption to increase threefold in the next quarter of a century, but it is entirely reasonable to expect it to double, bringing the total requirement to 6,000,000 tons.

Nor will anyone acquainted with the Hawaiian situation be found to predict an increase in output of 100 per cent in twenty-five years, or even in one hundred years. The land and water are not there to double with. Nor will Louisiana likely more than double her product in twenty-five years—and these two sources make up about two-thirds of the present domestic supply. If

consumption should double, and the present domestic supply should double, our present importation would have to double exactly, and this importation would require 4,000 per cent more sugar than the Philippines now produce. Is it reasonable to believe that the Philippines could ever produce as much sugar as all the balance of the tropical world now produces? I think not.

Should consumption remain stationary and home production double, there would still be need for a million tons of sugar, which is twice as much as the Philippines have prospect of ever producing.

There is room for considerable increase in sugar output in the Philippines, but the capital and the initiative and the organizing ability must largely come from the outside and join with the people here who own the lands. The people own the sugar lands, however, always in too small bodies to justify large factories. They generally have very little desire to sell their holdings, and still less to organize and cooperate in a way to make central mills a success. They are generally suspicious of each other and of outsiders, making business discouragingly slow.

There are no ports on the west side of Negros, and all sugar has to be hauled out of the interior and sent to Iloilo on small sailing craft that can come up to the coast with the tide. Until railroads are built no very great things in expansion need be looked for, and it is estimated to require five years to complete a railroad. The laws applicable to the islands do not allow a corporation to own land enough to justify a medium-sized central mill.

The sugar interests in the States have been pleased to speak of 70,000,000 acres of fine sugar lands in the Philippines and their enormous possibilities for production. By the same course of reasoning we may convince ourselves that the South will produce 100,000,000 bales of cotton, and the whole country 10,000,000,000 bushels of corn. Why, Louisiana has 12,000,000 acres alluvial land. If she should plant all this some year she would probably make 18,000,000 tons, or nearly twice the world's present supply. There is just about as much prospect of planting 1,000,000 acres in the Philippines as these 12,000,000 in Louisiana.

There is certainly more than three times as much waste mountainous land in the Philippines, in proportion to area, as there is in the cotton, corn, and sugar belts of the United States.

Some 50,000,000 acres of land in the Philippines are in forests, and the laws do not permit forest lands to be sold or leased until the valuable timber has been regularly cut under license, measured, and paid for. Even then a corporation can not own more than 2,500 acres, which is not regarded as sufficient to induce capitalists to invest in large factories. As a matter of fact, not a dollar of American capital has been invested in sugar growing in the islands during these six years. In fact, if suitable organizations could be effected so as to control the necessary acreage, I believe that a few central factories could do well in the Philippines.

Laborers are not ambitious to work at the prevailing rate of wages, but there is little doubt that, with some better inducements offered, a limited number of concerns could get the labor needed and make money. The price of labor is certain to advance with the building of the railroad system in the islands, and this result will still be more marked if roads, bridges, schoolhouses, and other public works badly needed are constructed. This industry must begin, however, just where Cuba began forty years ago and where Java began fifty years ago.

Now, I wish to state a fact that will surprise you. The farmers and farm laborers in the islands cultivate 2.56 acres each. In America each farmer and farm laborer cultivates 40 acres.

As you gentlemen can plainly see for yourselves, the great body of the present generation of Filipino people is without muscular development, without the habit of sustained industry, and lacking in that acquisitive ambition to make them steady laborers. People that have lived content for years working no more than 2½ acres to each actual farm laborer need not be expected suddenly to do great things in an industrial way. I believe a fairly good supply of labor for a limited number of enterprises can be had with a reasonable advance on present rates of wages; but the next generation must be looked to for the best results.

In the discussions before the Ways and Means Committee last winter a great deal was said as to the cost of production of sugar. The truth is, it costs every man a different price from every other man. Every different system

shows up a different cost for each man. Matters of average cost are extremely difficult to determine, especially if that cost must be traced through field, factory, and through the markets.

* * * * *

Colonel HILL. You have been through the sugar plantations of the islands yourself?

Mr. WELBORN. Yes, sir.

Colonel HILL. And during all seasons of the year?

Mr. WELBORN. Yes, sir; more or less.

Colonel HILL. In the cultivation of sugar cane, you say they never use anything except the tops in planting?

Mr. WELBORN. No, sir.

Colonel HILL. When you prepare your fields for planting, how deep do you plow?

Mr. WELBORN. I don't know about that; they have to plow the land three to five times and I suppose go 4 or 5 inches. We have a great deal of Johnson grass, Bermuda grass, and nut grass, but they are minor pests as compared with the other grasses we have. They are much worse than anything you have in Louisiana. The native plow is a very crude affair, and a man takes a carabao and scratches over the ground, probably going about an inch deep in the first operation. If he goes over the ground three times, he will get an inch deeper each time. If he goes over it five times, I should say he would get about 5 inches deep.

Colonel HILL. Do you not think they would average more than 5 inches deep?

Mr. WELBORN. No, sir; I think not.

Colonel HILL. What other instruments do they use for cultivation besides the plow?

Mr. WELBORN. Well, nothing at all, except the simple little plow. Nothing but that, except when they are clearing off these heavy grasses; then they use a cane hoe. The grasses are very troublesome; that is one reason why it takes a man to cultivate one hectare of land here, whereas in the States he can cultivate ten or twenty times as much.

Colonel HILL. What is the last operation?

Mr. WELBORN. The last thing is to drag up dirt with hoes from the middles and heap it up in the drill to cover the grass and to make ditches out of the middles to stand our wet season.

Colonel HILL. Now, in order to have a hectare of cane cultivated by one man, how many carabaos are necessary?

Mr. WELBORN. Well, two carabaos are necessary to keep a man busy—one in the mud wallowing while the other is in use. They are changed about once every hour. A man should have an extra carabao; he can not work them steadily.

Colonel HILL. Is there any scarcity of hands when the grinding season begins?

Mr. WELBORN. Yes, sir; they get labor from the other provinces during that season.

Colonel HILL. How many tons of cane would be cut by one of your workmen?

Mr. WELBORN. I could not say about that. Nobody here weighs cane.

Colonel HILL. Have you ever made any estimate as to the tonnage per acre?

Mr. WELBORN. Yes, sir; it has been my opinion that the yield in Negros was about 2 tons of sugar to the acre; that would require 20 tons of cane under the methods here. But when the census report came, however, I found that in 1802 they made only 2,800 pounds to the acre in Negros, and that was a better year than we have had since, so I must reduce my figures.

Colonel HILL. I understand you to say that there is no explanation of the necessity of having cane replanted year by year?

Mr. WELBORN. Well, I would not make so sweeping a statement. In some places in Negros they do get one ratoon crop, but never more. The third crop would not pay for the gathering.

Colonel HILL. Is that the practice throughout Negros, or on the coast only?

Mr. WELBORN. Well, the lands are poor on the coast; they get better as you go inland. They do not get a ratoon crop on the coast lands at all; that is only done upon the new and fresher lands farther inland.

Colonel HILL. You never get more than one ratoon crop?

Mr. WELBORN. Never to my knowledge; everybody here agrees upon that.

Colonel HILL. Have you visited the island of Negros yourself?

Mr. WELBORN. Yes, sir; three or four times.

Colonel HILL. What is considered the dry side of Negros—Occidental or Oriental Negros?

Mr. WELBORN. Well, I have never been in Oriental Negros; I do not know enough about that. There is no sugar grown in Oriental Negros. The conditions are about the same on both sides of the island; however, I should say one side is as dry as the other.

Colonel HILL. Why is there no sugar grown in Oriental Negros?

Mr. WELBORN. Well, I do not know; probably it is poor land; in fact, I have been told that the land over there is poor.

Colonel HILL. Is that due to lack of water?

Mr. WELBORN. Possibly so, but I rather think it is due to the fact that the land is not fertile; I have heard so.

Colonel HILL. Have you never heard it compared with Hawaii as being similar to the dry lands in Hawaii?

Governor-General WRIGHT. My information is that there are no arid lands in the Philippines. The northeast monsoon affects the lands during one-half of the year and the southwest monsoon during the other.

Commissioner WORCESTER. There are no arid lands in the island of Negros. The rainy season comes at opposite times on the two sides. However, there is a small district near Bais, in Oriental Negros, where cane is grown and where the conditions are about the same as at Bacolod. There is no irrigated sugar land in the Philippine Islands and never has been.

Mr. WELBORN. As proof that it is not arid, there is a good deal of hemp grown there.

Commissioner WORCESTER. One reason why there is more sugar in Occidental Negros than in Oriental Negros is that in the latter there are large amounts of timber land. The cost of clearing is very high—in fact almost prohibitive. The last time I was in Oriental Negros, some thirteen years ago, there were very extensive forests to the east of the mountains between Bais and Dumaguete.

Colonel HILL. In regard to the expected return to be made to the United States by reason of the remission of duties—that is, by the increase of trade to the extent of many millions—what do you mean by that?

Mr. WELBORN. Well, I had in view the United States increasing her exports of cotton goods, iron products, food stuffs, etc.

Colonel HILL. Well, do you know whether, in the Philippine Islands, any effort has been made on the part of the American manufacturer to find out the style of article desired by the Filipinos?

Mr. WELBORN. Well, I believe that to be a great difficulty with many of them.

Colonel HILL. They are following the same practice here that they did in Cuba?

Mr. WELBORN. Yes, sir; they think that the American style is the best in the world. I think that they should begin to study the wants of the Filipinos, so as to be ready to extend their trade here by 1900, when the ten years' clause of the treaty of Paris will have expired and the bars can be put up against foreign countries.

Colonel HILL. In regard to plows; have you ever tried to introduce the "Fowler" plow from England?

Mr. WELBORN. No, sir.

Colonel HILL. Do you know what effect deep plowing of the land would have in producing ratoon crops?

Mr. WELBORN. I became interested in that subject this year and had one piece of cane land trenched 18 inches deep. I have a standing reward of \$5 for anyone who can show me the trenched land from that plowed 5 inches deep, by the growth of cane. Nobody has gotten the reward. The deep plowing seems to be no better than the shallow plowing.

Colonel HILL. When was that done?

Mr. WELBORN. In December, just before planting.

Colonel HILL. You do not know whether that would produce a ratoon crop or not?

Mr. WELBORN. No, sir.

Senator NEWLANDS. Mr. Welborn, in your observation of the agricultural holdings of the Philippines, have you noted whether the land is held in very

large estates and leased to tenants or whether it is held in small holdings and cultivated by the owners?

Mr. WELBORN. Well, it is in all sorts of ways. In Pampanga I believe the prevailing system is to have tenants and divide the crop—give each man a tract of land and have him cultivate it and then divide the proceeds.

Senator NEWLANDS. That is the case with sugar lands?

Mr. WELBORN. Yes, sir.

Senator NEWLANDS. Will you please specify what the rule is as to large or small holding of the different classes of agricultural lands—sugar, tobacco, and hemp?

Mr. WELBORN. Well, so far as I know and believe, there are two extremes. There are perhaps 10 per cent of what you would call large estates, and then 10 per cent of medium-sized estates, and the balance very much split up, so that the average-sized farm in the Philippines is about 6 acres, and 45 per cent of the farms is cultivated. The average-sized farm in the Philippines is the smallest of any country I have ever heard of.

Senator NEWLANDS. Now, you suggest that a corporation should be allowed to own 5,000 acres for a sugar estate. How many workmen would be needed on such an estate?

Mr. WELBORN. I do not know, because I have never run a plantation of that size.

Senator NEWLANDS. You estimate one man to the hectare, do you not?

Mr. WELBORN. That is the way they work now; but if I had that plantation and one man did not work more than a hectare of land I would get out of the islands.

Senator NEWLANDS. Is it your understanding that a corporation having 5,000 acres would employ 3,000 men? How many would be needed on an estate of that size in Hawaii?

Mr. WELBORN. The Hawaiian reports never make statements upon that point. They say how much it costs to plant, cultivate, and grind the cane, but they never make a statement as to the number of hands.

Senator NEWLANDS. How many men would you expect to employ on an estate of that size?

Mr. WELBORN. It would be a mere guess; I could not say.

Senator NEWLANDS. Well, the purpose of my question is this: My observation in the Hawaiian Islands has been that there is a very large population attached to each estate—a large number of Japanese and Chinese—who occupy small villages upon the estates. Now, these men have no interest in the soil; they are employed there in a capacity that does not train them for duties of citizenship. Now, with our plans for these natives—the plans we have for bettering them—I ask you whether, were we to permit these large plantations and large numbers of laborers attached to the soil, we would develop them in the duties of citizenship and in their capacity for self-government—and let me call your attention to the fact that for every laborer employed you will have a wife and a family of three or four at least, so for 2,000 laboring men you would have a population of 7,000 or 8,000 people.

Mr. WELBORN. My own view is that sometimes you have to take the least of two evils. These people cultivate land now in smaller parcels than I have ever heard of elsewhere. I have inquired particularly with reference to investment, and I have not found people particularly anxious to sell; they seem to want to hold on to what they have. They have gotten an idea, I think, that we Americans have got a lot of money, and as soon as anyone talks about purchasing their prices go up.

Secretary TART. I should like to ask, if a company came in here to manage 5,000 acres and did not lift up and improve their laborers and treat them with consideration, whether they might not count on losing money?

Mr. WELBORN. Well, I certainly believe in that principle. I should certainly feel that I was putting money into my pocket to care for them properly and feed them well, with a view to making a profit in the long run. I would teach them means of keeping well and of improving themselves. Whether every proprietor would feel like I do upon that point, I do not know. I am certain that you would not be able to buy up the whole country, however. These people hold on to their lands.

[From Senate Document No. 277, Fifty-ninth Congress, first session, hearings before the Committee on the Philippines of the United States Senate, p. 1088.]

STATEMENT OF GEORGE BRONSON REA, EDITOR OF THE FAR EASTERN REVIEW.

Cost of production.

* * * * *

Señor Jose Puig is owner of sugar hacienda "Ynaun," located at San Fernando, Pampanga. The depth of soil on his estate averages 3 feet, and is plowed to a depth of 6 inches. The lands, like most of those in Pampanga and the plain extending northward from Manila Bay, are about at sea level, being so low that proper drainage is impossible, so that with a wet season the water remains on the ground and drowns out the growth of the cane. This condition, existing up to above Angeles, is a disadvantage, which in the course of time will kill the cane industry in Pampanga and bring the lands under rice cultivation, for which nature has adapted them. The wage system under which Mr. Puig operates his estate is as follows: The owner supplies the land, house, carabaos, plows, and seed, and other tools and necessities, and the colono receives in return one-half of the product in rice and one-half of the sugar, less 10 per cent for the cost of manufacture. During the season the colono receives a monthly advance of 5 to 7 pesos to meet his minor necessities. Under this system it is extremely difficult to arrive at any fair rate of wage, as the accounts of both sides are a tangle which would puzzle a "Philadelphia lawyer." Now, this system is similar to what obtains in Cuba under the central factory system, where the factory owns the land. The average price paid to the independent farmer in Cuba for his cane delivered at the mill is 5 per cent of the weight in sugar, or its equivalent in cash at the current market price. When, however, the factory owns its lands, and labor is scarce, they make a contract with a farmer to cultivate so many acres, supplying him with land, seed, cattle, tools, carts, and money advances, and pay for the cane at the same rate as paid to the independent farmer, and divide the returns with their colono, and yet there is no complaint made there that the colono is enslaved. He can break the bargain whenever it becomes unprofitable to him or whenever the factory fails to carry out its part of the contract.

Under this share system, as obtains in Pampanga, the actual cost is only known at the end of the season by the difference between expenses and receipts, and last year, when sugars sold at an average of ₱6 per picul, the planters acknowledged to have made a little money.

For instance, Mr. Antonio Consenja, owner of the hacienda "Magliman," at San Fernando, admitted that last year he made ₱1,500, which really was not a profit but simply the amount left to him as overseer and manager of his own estate and factory. This is a sample small mill. His plantings were sixty balibas, or acres, which yielded 900 piculs of sugar, an average of 15 piculs per baliba. The cane is planted in rows 2½ feet apart and 1 foot between seed, and he never had a ratoon crop. The mud from the beds of the rivers is dredged out and scattered over the lands to serve as a fertilizer. His factory equipment is a small 6-horsepower 3-roller mill and engine, with three open batteries of five kettles each. His estimated cost was difficult to ascertain, but he opened his books in the presence of the governor of the province, which showed that his apparent profit on 900 piculs, at an average selling price of ₱5.50 per picul, was ₱1,500. In other words, he had this amount as between his expenditures of ₱3,450 and his receipts of ₱4,950, or an average cost of ₱3.83 per picul, which did not include any salary for himself or allow for loss in cattle, interest, etc.; so it can be fairly estimated that his cost was ₱4 per picul.

Mr. Joaquin Lingiano, of the hacienda Santo Tomas, at San Fernando, testified to me in the presence of the governor that he had planted the year previous 120 balibas, from which he had secured a crop of 1,200 piculs, or 10 piculs

per acre, or 1,375 pounds of sugar, and in bad years it was much less. His outfit was a little 6-horsepower mill and engine, with four batteries of kettles, averaging 30 piculs a day output. His accounts showed that he had sold his crop at an average price of ₱5 per picul, or a total of ₱6,000, and his apparent profit had been about ₱1,200, or ₱1 per picul. As he was working on the share system, it was pointed out that one-half of this profit went to the colono.

Mr. Juan Nepumaceno, operating a small steam mill at Angeles, stated that for the crop of 1905 he had planted 220 ballibas of land, from which a crop of 2,520 piculs had been secured, or something like 11 piculs per acre, or 1,507 pounds. His books showed that he had received an average price of ₱6 per picul, or a total of ₱15,120, and acknowledged to have made a profit of ₱3,000, or a cost of something like ₱4.80 per picul. His lands have to be planted alternately with rice and sugar, so he only secures a crop of sugar every two years. This yearly planting would naturally raise the cost somewhat.

* * * * *

Average cost in Pampanga.

[From data secured by George Bronson Rea.]

Lands under cultivation (approximate).

Yield of Muscovado sugar per "balita," maximum 20 piculs, minimum 15 piculs.

Crop of 1904, 2,100 piculs or pilones.

Value of lands, based on yield of 15 piculs = ₱40 per balita.

PLANTING EXPENSES.

Plowing 1 balita, 1 man and 2 carabaos, with native plow, average ₱2	
per time, 5 plowings, at ₱2	₱10.00
Harrowing, 2 times, at ₱1	2.00
Furrowing, 1 time, at ₱1	1.00
Drainage ditches	3.00
Planting 10,000 points	2.00
Hoing and weeding	7.50
Total	25.50
Yield of balita, 15 piculs; cost per picul	1.70

CUTTING CANE.

Work paid for on basis of each 10 piculs of sugar manufactured at mill, called a tarea or task, per task	.75
Food cost for above	.20
Cartage to mill, per task	1.00
Food cost for above item	.40
Total	2.35
Cost per picul	.235

MANUFACTURING EXPENSES.

Capacity of mill, 35 piculs per day.

Average day's work, 30 piculs per day.

Engineer (salary), per month	30.00
Fireman (salary), per month	15.00
Total	45.00
₱45	
25 working days × 30 piculs per day, per picul	.06
Mill men: 10 men, at ₱0.12½ per task and food, and 10 men in a shift,	
at ₱0.20 per day and food = $\frac{10 \text{ times } ₱0.125 + \text{ten times } ₱0.20}{30}$	.11
Sugar boiling: ₱2 per task, or ₱0.20 per picul	.20
3 men to battery × 6 batteries = 18 men; 2 sugar boilers = 20 men ×	
₱0.20 = ₱4 food cost $\frac{4.00}{30}$ = per picul	.13½

812 AGRICULTURAL CONDITIONS IN THE PHILIPPINE ISLANDS.

Six firemen for six batteries (wage, 0.30 + 0.20 food = 0.50), six times	
0.50 = 0.10 per picul.....	₱0.10
Fuel, ₱4.50 per day = per picul.....	.15
Hauling to town, per cartload of 7 piculs = ₱2.00 = 0.285 per picul.....	.285
Food of engineer and firemen.....	.013
Pilon (container).....	.50
Lima and oil.....	.05
Freight to Manila.....	.20
Planting expenses.....	1.70
Cutting and hauling.....	.235
Manufacturing.....	.766
Hauling to town.....	.285
Container.....	.50
Lima and oil.....	.05
Freight to Manila.....	.20
Overseer or owner's wages at ₱150 per month = ₱1,800 per year =	
1,800	
2,100 = per picul.....	.85
4.58	
137.5 = per pound = ₱0.033, or United States currency, \$0.016 per	
pound.....	4.58

COSTS IN NEGROS.

Now I want to submit a fair sample of detailed cost of making sugar in the island of Negros, and call your attention particularly to just where the opposition have made their error and also where the average Filipino planter errs in computing his actual costs.

In Negros the unit of land measure is known as the "lacsas," comprising 10,000 plants or stands of cane on a plantation. When crops are good a "lacsas" of new land will produce an average of 30 piculs, when poor about 15 piculs, while on the older lands the general average is about 16 piculs, or 1 ton. There are 3 "lacsas" of cane seed to 1 hectarea of ground, or equal to five-sixths of an acre.

There are some new lands that give still better results, and there are others that fall far short of this average, but generally speaking, 20 piculs per "lacsas" in what are classed as average harvests. On this fair average basis we will make an estimate for a plantation of 200 "lacsas," a 4,000-picul harvest, commencing with the expense of cultivation, milling, packing, and transportation, until the product is placed on sale in the market for the farmer, or, in other words, in the port of Iloilo, and it must be remembered that though the work of preparation is usually less costly in soft ground, there are other lands on which the expenses run much higher than those which are here set forth:

Planting and cultivation.

[Expenses per "lacsas."]

Four preliminary workings of ground.....	₱12.00
Planting or seeding.....	4.00
Three plowings and cleaning of plants.....	13.00
One final working.....	5.00
Total.....	34.00

The ₱34 for expenses of cultivation per "lacsas" will give us ₱1.70 per picul.

Cutting and manufacture.

[Expenses per picul.]

Cutting and carting of cane.....	₱0.35
Sun drying of bagasse.....	.10
Ovens and mill.....	.27
Total.....	

Packing and transportation, etc.

[Expenses per picul.]

Bags and rattan-----	P0. 13
Packers -----	.02
Carting to wharf-----	.25
Lighter transportation-----	.20
Expenses of delivery in Iloilo-----	.10
Agent's commission, Iloilo-----	.10
Total -----	.80

SUMMARY.

Cultivation, per picul-----	P1. 70
Milling, per picul-----	.72
Transportation, per picul-----	.80
Total -----	3.22

Or an apparent cost of P2.30, or \$1.15 per 100 pounds.

Now, if we rest on this as the final or absolute cost we would be greatly deceived, as much deceived as the planter who stops here with his details. It is true that the above is a fair average of general expenses, for in a reunion of planters held at Bacolod under the direction of the provincial governor they all more or less agreed on the point that the cost to plow, plant, and cultivate a "lacsá" would average P34, and I also ascertained, by a practical example on Señor Luzuriaga's estate, that the cost of cutting, hauling, and manufacturing was 80 cents per picul, by contract, as that was the price agreed upon with the contractor under which the crop was being harvested. In Mr. Luzuriaga's case I figured his bare costs down to P2.50 per picul, but, as in the estimate submitted, there are many other items which have been omitted entirely—the salary and maintenance of the manager and the permanent salaried force, oil, light, expenses of the plantation house, veterinary charges, repairs, commissions to labor contractors, loss of cattle, and other minor legitimate and necessary items. Without going into all of these, but just taking up the most prominent, we find on revision of the above as follows: A plantation to produce 4,000 piculs, with the expenses already noted and the following, will be:

Costs of 4,000 piculs, as indicated, at P3.22-----	P12, 880
Salary of manager-----	1, 000
Salary of assistant-----	480
Maintenance of above, at P50 per month-----	600
Four outside foremen, at P15 per month-----	720
Maintenance-----	288
Rice for laborers (500 piculs, at P5.50)-----	2, 750
Light, oil-----	60

18, 778

Or a cost per picul of P4.60.

And yet we have failed to include interest, repairs, depreciation, taxes, and other legitimate charges which are always difficult for any outsider to secure, but the above is ample corroboration of the costs as advanced by those interested in this measure, and it will be seen all the way through that the wages are kept way low, with the rates prevailing in other years.

And yet we have failed to provide for the loss of cattle through epidemic diseases.

* * * * *

DOCTOR WILEY'S LETTERS ON PERCENTAGE OF SUGAR SECURED IN THE PHILIPPINES.
STATEMENT OF CONDITIONS ATTENDING THE MANUFACTURE OF CONCRETE IN THE
PHILIPPINES—REAL AND HYPOTHETICAL DATA.

1. The juice expressed from the sugar cane in the Philippines has a density of 19° Brix.
2. The percentage of extraction is 50 per cent by weight of the cane.
3. The juice is concentrated without previous defecation in open kettles, lime being added to the juice in the first kettle.

4. Concentration is continued until the sugar in the finishing kettle contains only about from 5 to 10 per cent of water. The finished sugar is removed by buckets and placed in crystallizing tanks where, as it crystallizes, it is stirred with spades.

5. The finished product is not drained of its molasses, but is sold as concrete.

6. The average polarization of the concrete is 83.5, though it sometimes falls as low as 71.

The problem, then, is as follows:

One hundred pounds of cane furnished 50 pounds of juice containing 19 per cent of solid matter. The percentage of sugar in this expressed juice may safely be placed at 17 where the Brix is 19°. The juice thus has a purity of about 89. If no inversion nor caramelization should take place, the concrete formed would have the same purity, namely, 89, and its polarization, if free of water, would be approximately 89°.

The total weight of solid matter, of course, would be 9.5 per cent of the weight of the cane, less the loss in skimmings and plus the percentage of water. I understand from Mr. Welborn that the loss in skimmings is not over 3 per cent, which would leave 9.2 per cent of the weight of the cane in the concrete. The concrete will contain, say, an average of 5 per cent of water, and thus would represent 9.7 per cent of the weight of the cane.

A ton of cane, therefore, or 2,000 pounds, would make 194 pounds of concrete. As this concrete polarizes 83, it will contain in round numbers 160 pounds of pure sugar. The juice polarizing 17° from a ton of cane would contain 170 pounds of sugar. Thus, the total quantity of sugar inverted and caramelized during inversion would be 10 pounds, not nearly so much as I assumed in my former calculation, based on the supposition of a much higher caramelization than takes place under the present supposition.

I regret that a misunderstanding of the hypothetical and actual data resulted in the calculations of my first letter.

Respectfully,

H. W. WILEY, *Chief.*

UNITED STATES DEPARTMENT OF AGRICULTURE,
BUREAU OF CHEMISTRY,
Washington, D. C., January 25, 1906.

MR. GEO. BRONSON REA,
New Willard Hotel, Washington, D. C.

DEAR MR. REA: In compliance with your request I make the following statements respecting the hypothetical problem which you submit, as follows:

1. The juice expressed from the sugar cane in the Philippines has a density of 19° Brix.

2. The percentage of extraction is 50 per cent by weight of the cane.

3. The juice is concentrated without previous defecation in open kettles, lime being added to the fresh juice in the first kettle.

4. Concentration is continued until in the last kettle crystallization takes place, the contents of the kettle are stirred by means of a spade, and the molasses apparently disappears, the temperature for evaporation of the last kettle being necessarily high, this kettle being placed presumably over the hottest part of the fire.

5. The finished product is drained and the resulting muscovado sugar has a polarization of 88°. Question: What would be the probable yield of muscovado sugar on the weight of the cane ground? It will be necessary to assume a number of conditions in the discussion of this problem. The most important of these is the polarization of the juice, which is not given as one of the conditions above mentioned. It is safe to assume that in a juice of tropical sugar cane of 19° Brix the polarization will be 17°—that is, it will contain 17 parts of cane sugar per 100. This will net a purity, in round numbers, of 88. One hundred pounds of cane will yield 50 pounds of juice containing 8.5 pounds of sugar. During the process of skimming and transferring from kettle to kettle three-tenths pound of sugar will be lost, leaving a total of 8.2 pounds of sugar.

By reason of the neutralization of the acids of the cane juice with lime the quantity of inversion during boiling is reduced to a minimum. It will probably not exceed 1 pound, which will leave in the finished product 7.2 pounds of sugar. A considerable quantity of this sugar will be caramelized in the last kettle by reason of the high temperature of the boiling. The maximum degree

of caramelization, however, will not exceed 1 pound, leaving 6.2 pounds of sugar for 100 pounds of cane. On draining after concentration not to exceed 1 pound of sugar will be withdrawn with the molasses, leaving 5.2 pounds of sugar from 100 pounds of cane. As this sugar polarizes only 88, 5.2 pounds of pure sugar will represent 5.9 pounds of sugar, or, in round numbers, 6 pounds.

It thus appears that 6 pounds of muscovado sugar polarizing 88 will be obtained from every 100 pounds of cane, or 120 pounds of sugar for each ton of 2,000 pounds. * * *

Respectfully,

H. W. WILEY, *Chief.*

[From Report of the Philippine Commission, 1906, part 2, p. 169.]

SUGAR CANE.

Some experiments in cane culture were carried on at Manila. Five leading varieties of cane coming to us from Honolulu were tested for yield and saccharine content. This cane had been planted early in the dry season, was well fertilized, and well worked. By September it had attained very much more than the usual size; in fact, it had become so large that it suffered much more than cane of the usual size from the great typhoon of September 26, 1905. We found that it was so broken and twisted that the experiment was worthless. The average yield when harvested indicated 24 tons per acre. The laboratory results showed that none of it would have been profitable for milling. This arose from the damaged condition of the cane and sprouting and new growth that set up after the damage. A part of this experimental patch was prepared by trenching 18 inches deep and the balance by plowing about 5 inches deep. No difference could be observed in the growth of the crop. Another planting of cane was made in June, 1905—an unusual time for this country—to see if it could be carried through two wet and one dry season, aided by irrigation, and mill at end of last wet season, and thus lengthen the usual grinding season. This cane is now fourteen months old and has not flowered. I think it will not flower until the end of the wet season, bringing it up to sixteen or seventeen months of age. But another trouble has been encountered. It has grown tall, with thin stalks. With the advent of the rains the tops became quite heavy. It has already been severely injured by one typhoon, and it is quite likely that the next one will spoil it so it would not be worth milling. It is now my opinion that in most of the islands cane will have to be planted so as to ripen in twelve months, and even then fertilizing and irrigating so as to stimulate extraordinary growth may prove unprofitable on account of our severe storms. Several imported varieties have shown greater vigor than the cane long grown. These differences were exaggerated, too, by the fact that the new canes were planted early, fertilized, and given a better chance. They showed a tendency to ripen later and to have less sugar in juice. These tendencies would be a natural result of the fertilizing, etc., so there is probably less difference in value of the varieties than most men have believed from looking at the canes. Other sugar-cane experiments are in progress, but no results can yet be announced.

TOBACCO.

[From Census of Philippine Islands, 1903, vol. 4, p. 32.]

TOBACCO.

In point of commercial importance tobacco is the third agricultural product of the islands.

The relative value of tobacco exports, leaf and manufactured, varied year by year, ranging from 3.28 per cent in 1881 to 27.09 per cent for the five months in 1898, for which statistics are in existence, and averaged, for all the years reported, 12.43 per cent of the total value of exports.

The plant is of American origin and was originally introduced into the Philippines from Mexico by Spanish missionaries in the latter part of the sixteenth century shortly after the establishment of Spanish sovereignty; recently certain varieties are supposed to have been introduced from the United States.

The species (*Nicotiana tabacum*) embraces a wide range of varieties, a large number of which are produced in the Philippines, which are classified into two groups known, respectively, as "tobacco from old seed" and "tobacco from new seed." The first group consists of varieties having elliptical or ovate, wide or heart-shaped leaves, and the second of the kinds bearing lanceolate, narrower leaves than those of the first group. The tobaccos of the second group are believed to be from seed imported from the United States.

From the time of its introduction until 1781 slight attention was paid by the Spanish Government to tobacco production in the islands, and its exclusive right to traffic in the product was not enforced until that year, when the production and sale of the article were formally made a State monopoly, as far as the island of Luzon was concerned. The Visayan and other islands south of Luzon were not affected by the Government monopoly, and their tobacco growers were always free to sell their product either to the Government or privately, as they saw fit.

The monopoly of the Government in the island of Luzon remained in existence for one hundred and one years, and was terminated December 31, 1882. During its existence it became an important source of revenue, and in its last year, 1882, yielded profits amounting to about 50 per cent of the total budget expenditures of the Philippine government.

Notwithstanding the maladministration, crying abuses, and practical slavery that had grown up under the monopoly system, which finally led to its abolition, the native tobacco growers opposed its discontinuance, having become accustomed to its workings and fearing that a private monopoly of tobacco speculators would result in the imposition of evils harder to bear than those to which they were already subjected. For several years prior to 1882 the question of abolishing the monopoly was under consideration by the Government; the clergy joined with the growers in opposing the measure, and were able to defeat its adoption for a time, but the evils of the system were so overwhelming as to finally secure its termination in spite of all opposition.

With the inauguration of freedom of production and sale, the tobacco industry took on a new impetus, and since 1882 the annual shipments of both leaf and manufactured tobacco have considerably exceeded those of the monopoly period; the number of cigar factories has increased, as well as the number of persons employed in tobacco production and manufacture. There is an enormous home consumption of cigars and cigarettes throughout the archipelago, and this, added to the demands of the export trade, renders the industry one of the most important of the islands.

The best qualities of tobacco are grown in northern Luzon, particularly in the provinces of Cagayan and Isabela, where the production is larger than elsewhere. Considerable quantities are also grown in other provinces of Luzon—Ilocos Norte, Ilocos Sur, Nueva Ecija, Nueva Vizcaya, Pampanga, and elsewhere—while the Visayan and other southern islands yield the plant in appreciable quantities, though of generally inferior qualities.

A description of the cultivation and preparation of tobacco for market, together with other data regarding the handling and marketing of the crop in the province of Cagayan, Luzon, where the largest quantities of the higher-grade qualities are produced, are given in the following special report:

[From hearings before the Committee on Ways and Means, House of Representatives, January 23-28, and February 3, 1905, p. 148.]

COMMITTEE ON WAYS AND MEANS,
HOUSE OF REPRESENTATIVES,
Washington, D. C., January 27, 1905.

STATEMENT OF COL. C. R. EDWARDS.

Exportations of tobacco from the Philippine Islands during the calendar years 1880 to 1904, showing shipments to the United States as compared with the total exports of tobacco from the islands.

[Data for years 1880-1894 compiled from official returns of the Spanish Government, as contained in the publication "Estadística General del Comercio Exterior de las Islas Filipinas." Data for years 1899-1904 compiled from official returns of the Insular Bureau.]

Calendar year—	Leaf tobacco.				Cigars, cigarettes, etc.		Total.	
	United States.		Total.		United States.	Total.	United States.	Exports.
	Quantity.	Value.	Quantity.	Value.				
	Pounds.		Pounds.					
1880.	4	\$23	915,453	\$331,536	\$900,091	\$1,897,042	\$900,114	\$2,228,578
1881.	132	2,003	3,329,007	594,141	14,935	123,132	16,968	717,277
1882.	110	17	12,448,953	1,058,928	478	387,909	495	2,346,887
1883.	1,619	448	7,405,506	1,240,429	2,350	1,348,956	2,798	2,584,387
1884.			2,742,234	482,736	4,289	1,104,192	4,289	1,586,928
1885.	33	3	12,829,034	1,288,955	2,092	1,008,408	2,095	2,297,358
1886.	101	53	11,218,280	759,831	1,004	1,250,162	1,067	2,010,088
1887.	565	108	9,435,995	640,699	17,843	918,371	17,451	1,550,070
1888.	70	31	21,431,632	1,340,314	10,115	1,106,911	10,146	2,449,225
1889.	2,132	207	20,105,054	1,404,754	17,559	850,740	17,768	2,255,494
1890.	5,300	247	19,403,096	1,320,752	5,504	1,148,281	5,941	2,469,083
1891.			19,950,300	1,258,748	2,811	891,568	2,811	2,150,308
1892.	2,226	150	26,700,014	1,554,284	405	981,476	555	2,535,740
1893.	1,417	98	23,638,105	1,463,853	2,211	989,451	2,809	2,483,304
1894.			15,442,067	702,922	1,018	873,258	1,018	1,576,175
1895 *								
1896 *								
1897 *								
1898 *								
1899.			14,050,310	776,841	3,405	1,154,412	3,405	1,931,258
1900.	110	7	22,028,546	1,033,900	5,662	1,227,332	5,669	2,261,232
1901.			17,391,596	748,485	984	1,833,456	984	2,631,941
1902.	235,420	41,538	20,196,283	955,106	11,000	1,007,468	52,544	1,932,024
1903.	9,168	790	19,249,094	954,259	1,903	982,616	2,693	1,946,875
1904 ^b			16,443,430	861,073	878	873,387	878	1,734,400
Annual average:								
1890-1894.	373	498	5,368,231	921,554	106,428	971,246	106,925	1,892,800
1895-1899.	590	80	15,003,079	1,086,931	9,623	1,027,317	9,708	2,114,248
1890-1894.	1,989	99	21,026,714	1,290,107	2,408	972,805	2,507	2,232,912
1899-1903.	48,949	8,467	18,583,165	893,730	4,692	1,258,055	13,069	2,146,785

* Figures not available.

^b Ten months ending October 31, 1904.

Market quotations for Philippine tobacco, from the Daily Bulletin, Manila, December 12, 1904.

Leaf tobacco.	Price per quintal (101.44 pounds).
Isabela, 1901, first to fifth class.....	\$15 to \$42
Oagayan, 1901, first to fifth class.....	11 to 38
Isabela, 1902, first to fifth class.....	16 to 36
Oagayan, 1902, first to fifth class.....	10 to 32
Briff:	
First class (few stocks offered).....	13.50
Second class.....	11.00
Third class.....	9.50

Export price of Philippine tobacco according to cable advice from the civil governor, dated Manila, January 20, 1905.

	Price per pound (gold).
	Cents.
Wrapper tobacco.....	30
Filler tobacco.....	10
Smoking tobacco.....	7.5

These tables have been compiled out of a lot of data, and they may save the committee a little work, if they are not original.

* * * * *

Colonel EDWARDS. Then here is a chart showing the exports of tobacco for the Philippine Islands since American occupation, crude and manufactured. I will submit that, Mr. Chairman, and whether it ought to be printed or not is to be determined. Two or three members of the committee have asked me for information upon the exports of the tobacco from the Philippine Islands to the countries mentioned during the fiscal years 1899-1904 for leaf tobacco, cigars, cigarettes, and others, manufactured. This table has just been worked out, and therefore I think will be useful to the whole committee. It will be found at the conclusion of this statement.

Also inquiries have been made of me as to the import duties charged by foreign countries on the Philippine tobacco and its manufactures sent to Germany, Austria-Hungary, China, etc., and I have dug that information out of the respective tariffs of those countries and had them translated, and they will probably be of use as they are reduced to United States measure.

Import duties charged by foreign countries on Philippine tobacco and its manufactures.

The bulk of Philippine tobacco and its manufactures exported is credited to the United Kingdom, Germany, France, Spain, Austria-Hungary, Netherlands, China, Japan, British East Indies, Dutch East Indies, and Australla. The import duties levied on tobacco in its various forms by these countries are given below:

UNITED KINGDOM.

Tobacco, unmanufactured, containing 10 pounds or more of moisture in every 100 pounds of weight thereof.....	per pound..	\$0. 79
Tobacco, unmanufactured, containing less than 10 pounds of moisture in every 100 pounds of weight thereof.....	per pound..	. 87
Cigars.....	do.....	1. 46
Cigarettes.....	do.....	1. 17

820 AGRICULTURAL CONDITIONS IN THE PHILIPPINE ISLANDS.

GERMANY.

Tobacco in the leaf, unmanufactured	per pound	\$0. 092
Tobacco, manufactured, leaves wholly or partly stripped; waste of manufactured tobacco leaves	per pound	. 195
Tobacco stalks and ribs	do	. 092
Tobacco, chewing, and snuff	do	. 195
Cigars and cigarettes	do	. 292

FRANCE.

Tobacco, in leaves or stalks:		
For the Regie	Free.	
For private account	Prohibited.	
Tobacco, manufactured, for the Regie	Free.	

NOTE.—Limited quantities of manufactured tobacco, not to exceed 22 pounds per consignee per year, may be imported for personal use under a special tariff.

SPAIN.

Cigars of foreign manufacture Regie duty	per pound	\$2. 63
Cigarettes Regie duty	do	1. 43
Cut tobacco, Regie duty	do	1. 43

NOTE.—The tobacco monopoly may clear through the customs manufactured tobaccos for private persons, but with a further tax of from 12 to 25 per cent ad valorem, according to class of manufacture.

AUSTRIA-HUNGARY.

Tobacco, unmanufactured (imported by special permission)	per pound	\$0. 046
Tobacco, manufactured (imported by special permission)	do	. 115

NOTE.—In addition to the duty, the following licensing tax is to be levied for every pound of the net weight paying duty:

Cigars and cigarettes	per pound	\$2. 03
Other manufactured tobacco	do	1. 55
Unmanufactured tobacco	do	1. 29

NETHERLANDS.

Tobacco:		
In leaves, rolls, and unflattened ribs	per 100 pounds	\$0. 13
In leaves, rolls, and flattened ribs	do	. 274
Cut, snuff, and other manufactures	do	2. 193
Cigars	do	7. 31

CHINA.

Tobacco:		
Leaf	per 100 pounds	\$0. 43
Prepared, in bulk	do	. 51
Cigarettes:		
First quality (exceeding \$3.24 per 1,000 value)	per M	. 36
Second quality (not exceeding \$3.24 per 1,000 value)	do	. 07
Cigars	do	. 36

JAPAN.

Tobacco, leaf, ad valorem	per cent	70
Cigars and other manufactures, ad valorem	do	300

NOTE.—This includes war tax of 100 per cent on previous tax.

BRITISH EAST INDIES.

Tobacco:		
Unmanufactured	Free.	
Manufactured, ad valorem	per cent	5

DUTCH EAST INDIES.

Western Borneo:			
Tobacco, smoking, and snuff	per 100 pounds	\$1.466	
Manila cigars	do	36.54	
Other cigars and cigarettes	do	9.13	
Residency of east coast of Sumatra:			
Tobacco—			
Chinese	do	2.20	
Manila and Habana	do	5.50	
Snuff	do	7.31	
Cigars, Manila and Habana	do	36.54	
Other cigars	do	9.13	
Territory of Lobok:			
Tobacco (as unenumerated goods and not in list of exceptions), ad valorem	per cent	4	

AUSTRALIAN COMMONWEALTH.

Tobacco:			
Manufactured	per pound	\$0.79	
Unmanufactured	do	.79	
Unmanufactured, but entered to be locally manufactured into tobacco, cigars, and cigarettes, to be paid at the time of removal to the factory			
	per pound	.36	
Cigars, 15 per cent ad valorem and per pound		1.52	
Cigarettes	per pound	1.57	
Snuff	do	1.57	

NOTE.—In addition to the above duties excise charges are assessed as follows:

Tobacco, manufactured	per pound	\$0.24	
Cigars	do	.36	
Cigarettes	do	.73	
Snuff	do	.49	

* * * * *

[Same Hearings Page 205.]

COMMITTEE ON WAYS AND MEANS,
HOUSE OF REPRESENTATIVES,
Washington, D. C., January 28, 1905.

STATEMENT OF HON. WILLIAM H. TAFT, SECRETARY OF WAR.

* * * * *

Now, coming to tobacco. It is produced for export chiefly in three provinces, the province of Cagayan, which is the northeast province of the island of Luzon; the province of Isabela, which is immediately south of Cagayan. These are the two provinces constituting what is called the valley of the Cagayan River. The Rio Grande del Cagayan, the largest river in the islands, runs through these two provinces and overflows its banks, and the rich tobacco land is in that part of the valley which is overflowed. The two provinces are very sparsely settled, the ratio of men to the mile being less in those two provinces, I think, than in any other province in the islands excepting possibly Mindanao and Samar.

Tobacco is also raised for export in the province of Union. And probably tobacco may be exported also from the other three provinces of Ilocos Sur and Ilocos Norte and Abra. Those are the only provinces that raise tobacco for export at all. The arable land in the Ilocos provinces is narrow, lying between the coast range which comes quite near to the seashore; and the tobacco in those provinces is planted in the narrow river valleys that come down from the mountains between the hills. In Cagayan and in Isabela there is a very considerable territory that could doubtless be opened up for tobacco culture, but it is a territory that is covered with a dense forest, so it will require the expenditure of a great deal of energy to spread that culture. Isabela has 5,000 square miles and 3,000,000 acres, with a population of 76,431. Cagayan has an area

of 5,000 square miles, 3,000,000 acres, and a population of 156,000. Ilocos Sur has 475 square miles and 371,000 acres and 187,000 people. You will observe that is a very much more populous province than the others. Ilocos Norte has 1,330 square miles, 851,000 acres, and a population of 878,000 people.

The Ilocanos are the most industrious people in the islands, but the residents of Isabela and Cagayan, the two great tobacco provinces, are probably the laziest people in the islands. There are among them some Ilocanos who have come from across the mountains and settled in that valley. The Cagayan Valley is possibly the place where we expect to make a great development by the construction of railroads. But the labor problem will always embarrass us. It is in that valley that it is possible to raise one crop of tobacco and two crops of corn on the same land in the same year. The cultivation of tobacco, originally a monopoly, and in the hands of the Spaniards, and subsequently given up, is now almost wholly confined to small tracts cultivated by families. The cultivation of the plant is not scientific at all. There are three or four large haciendas in Isabela. The Tabacalera Company owns one hacienda; the government, now owns one obtained from the Augustinians by purchase, and there are probably two or three German firms that have haciendas there, and upon these haciendas, or plantations, I assume, the only good tobacco is raised.

The governor of Cagayan, Señor Gonzaga, who is an expert in the tobacco business, has written a paper on the subject within the last year—the subject of the cultivation of tobacco in the two provinces of Cagayan and Isabela. With the permission of the committee I would like to submit it. He gives the history of its cultivation and shows that under present conditions, with the very large number of small tobacco farms, the attention to the plant in the way of keeping worms off the leaves and preparing leaves properly for market have led to a depreciation in the character of the tobacco produced.

Mr. GROSVENOR. What do you mean by keeping off the worms?

Secretary TAFT. The worms attack the leaf and eat a part of it.

Mr. GROSVENOR. That is the only feature of the cultivation of tobacco that has never been improved since I have known about it. They all have to be picked off by hand.

Secretary TAFT. Exactly. Where a man leaves it to the family he will usually not find the plants well tended. It is pretty hot in the Cagayan Valley, though comfortable under the trees. There is no European or American head to see to it that the work is done. Ordinarily the leaf comes to market, therefore, in a defective condition.

The CHAIRMAN. In the United States they cover it over and conserve its quality.

Secretary TAFT. I understand they do that for the purpose of getting a wrap-leaf.

The CHAIRMAN. And they also do that for keeping parasites off the leaf.

Mr. TAWNEY. Can you give us any idea what proportion of tobacco land in those provinces that you have named are owned and cultivated by the natives, and what proportion is owned by outsiders—Americans, Germans, or English?

Secretary TAFT. Well, I should say 75 per cent.

Mr. TAWNEY. Owned by the natives?

Secretary TAFT. Yes.

Mr. TAWNEY. And cultivated by the natives?

Secretary TAFT. Yes, sir; the tobacco business in the islands is largely—

Mr. WILLIAMS. Before you go to that, I would like to ask, are there any worms or insects that attack tobacco in the Tropics that do not in the Temperate Zone?

Secretary TAFT. I am not advised. All I know is that the crop of insects in the Tropics is larger than the crop of anything else. The islands have suffered for the last three years most disastrously from the locusts; they have stripped rice fields and other fields bare. We had to pass a law putting every man, woman, and child under the control of the presidente and the governor of the province for the purpose of meeting that pest as a public danger.

We sent them out into the fields to drive out the locusts—you will remember that you gave us a \$3,000,000 relief fund—out of this we bought rice to feed the natives while engaged in this work. And we were able to drive the locusts, before they became able to fly, into trenches. We sent our corrugated-iron sheets and placed them at one end of a field where the locusts were, then the whole population gathered together and drove them into the ditches at the foot of these plates, and then they were buried. They were then what is called loc-tones, mere leapers, not fliers. By using that extraordinary means throughout

the islands this year the locusts have for a time been destroyed. But I am not prepared to say whether the locusts are tobacco consumers or not; I think not. But there are worms to which the plant is subject, and it is for that reason that they usually separate the tobacco plantation from the sugar plantation, because the sugar attracts all sorts of insects.

I was going to say that the reason for my answer—that about 75 per cent of the tobacco, probably a greater per cent, is produced from small farms—is that the tobacco business in the Philippines Islands is a business of buying. The Tabacalera Company, which is the largest, and a great many others have their buyers in every province, where tobacco is raised for export. These two provinces, the Isabela and the Cagayan, are full of buyers, and the oppression that we fear and try to avoid for the native is the oppression of the presidentes of the towns in insisting that the small tobacco planters shall sell to him, and he shall turn over to the company with a commission. We are constantly running into that kind of oppression and constantly removing the presidente because of his attempt to monopolize that which belongs to the small planters, and which in the aggregate in a town reaches a large sum. It is the purchase of tobacco on the small farms that makes a large part of the business in Manila.

Mr. COOPER. Is there any competition in the purchase of tobacco there?

Secretary TAFT. Oh, yes; the Tabacalera Company, which is the largest company, has the longest purse, and is the most successful; but there are other firms that are in the market purchasing, so that there is considerable competition.

Now, with reference to the price of tobacco, General Wright says that the wrapper leaf is worth in the Manila market to-day 30 cents, gold; and if you were to introduce it into this country at 25 per cent of the present tariff, making no charge for the freight, as I understand, it would bring it up to something like 76 cents; and he says the trade is of the opinion that the wrapper is all used in Manila factories and that none would come here under any circumstances. That would seem to be likely, because the local Connecticut wrapper sells for less, I believe, than 76 cents.

With reference to the filler leaf he says the price in the Manila market is 10 cents, and for smoking tobacco 7½ cents. That would, without charging anything for transportation at all, with the duty at 25 per cent of the Dingley rates, make the cost of the filler leaf here about 18 cents a pound. As I understand it, Ohio and Pennsylvania and other filler leaf is considerably less than that.

The CHAIRMAN. About 10 cents.

Secretary TAFT. Well, so that on the whole I think that there was no particular danger, except the danger which has been suggested here that the American people are going to change their taste and let in the Philippine tobacco instead of Cuban.

Mr. GROSVENOR. Do they export any tobacco now elsewhere than to the United States?

Secretary TAFT. They do not export any to the United States, and they export 19,000,000 pounds, 13,000,000 of which go to the tobacco monopoly countries of Europe. The rivalry which is feared, I understand, and with respect to which there is probably more basis than anything else in this discussion, is the fear with respect to cigars, because the cost of labor in Manila is considerably less per thousand for cigars than it is here. I understand that the perfecto cigar is a cigar of a certain size, volume of tobacco, and of certain shape. Now, the perfecto cigars made of a Habana filler by Cubans in this country costs for labor \$34 and sell at \$120 a thousand. That the same cigar made by regular hand work, as I understand it, costs for labor \$17 a thousand, and is put on the market at \$70. But the perfecto of the Philippines costs in Manila about \$25 gold, and of that the labor is from \$6 to \$7 per thousand. The cost of this cigar laid down in the United States, not counting in the freight, but with the duty of 25 per cent, would amount to about \$45 per thousand.

Now, then, the assumption that that would undersell Cuban tobacco—I mean Cuban cigars—is an assumption that I beg respectfully to dispute. I hope that the Philippine cigar will achieve a better reputation among American smokers after its exportation to this country than it has now. I have brought several thousands of cigars from the Philippines in ecstasy of Philippine enthusiasm, and have sent them to my friends who smoke, but the expression of thanks is for the courtesy, but not for the cigars; and while that may not indicate that the taste will not be formed for Philippine cigars, it nevertheless shows that time must be taken, and that they will not permit a rival cigar on the same

level as the Cuban cigar, whether that cigar be made in this country or in Cuba.

* * * * *

Tobacco is raised in nearly every province in the Philippine Islands, but it is not usually exported, except from the provinces I have named. It is of a poor character, but it is quite sufficient to make cigars as long as two feet and two inches thick, that hang from the roofs of the cabins and are used as family cigars, the mother, the father, and the children all taking a whiff when convenient. The truth is, that in the United States you calculate that one-half—that is, the female portion—do not use tobacco at all, and not, I suppose, more than 60 or 70 per cent of the male. In the Philippine Islands, of the 7,000,000, I suppose six-sevenths of the men, women, and children must be considered as active consumers of tobacco. And that creates an enormous demand—I mean enormous in proportion to the population—for the tobacco which is raised in the islands. It is only the better kind of tobacco that is exported; the rest is used for home consumption.

I should be glad to answer any questions so far as I may.

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[Same Hearings, page 211.]

Report of Governor Gonzaga.

[Introduced by the Secretary of War.]

THE CULTIVATION OF TOBACCO IN THE PROVINCE OF CAGAYAN.^a

Cagayan, situated in the extreme north of the island of Luzon, enjoys a more temperate climate than the other provinces of the Philippine Archipelago. Surrounded by mountains covered with vegetation and crossed in all directions by rivers and estuaries, there is maintained in the soil by the frequent overflows an accumulation of those fertilizing agencies essential to agricultural purposes.

The implements and methods of agriculture used by the inhabitants of Cagayan for the cultivation of rice, wheat, tobacco, corn, cotton, vegetables, etc., are of the most primitive kind, as is the case in all the provinces of the Philippine Archipelago.

The plow used in the preparation of the fields is of Chinese model and origin, with narrow shares, shaped like wings, of a smaller size than those used in Europe. To this a carabao is hitched, the only work animal used by the Filipinos, perhaps by reason of its greater strength and endurance as compared with all other cattle of the country. In spite of this, the plow hardly penetrates the soil more than 10 centimeters in making furrows in irrigated lands used for the cultivation of rice, while in dry lands and fields intended for tobacco the farmer finds it necessary to cross the ground three, four, or even more times in different directions in order to turn the earth over to a depth of 25 or 30 centimeters.

The Spanish Government, in creating a State monopoly of the sale of tobacco, extended the cultivation of this article throughout this province at the expense of all other agricultural products, the cultivation of which was greatly restricted; at the same time subjecting all agricultural labor connected with the production of tobacco to a strict accounting, without regard to private property or the climatological conditions of each locality.^b

Such action was a useful lesson in agriculture to the inhabitants of Cagayan, because it proved that in sections within the influence of the seas, although tobacco grows and develops, it is of bad quality and of a disagreeable flavor. For this reason the districts on the seacoast as far as Lallo were not forced to engage in the cultivation of this article, which was confined, as it still is, to the interior districts—such as the Gattaran, Nassiping, Alcala, Baggao,

^a This report was prepared by Gov. G. Gonzaga, supervisor of the census, province of Cagayan, Luzon.

^b This monopoly was established by royal decree, 1781, and was terminated December 31, 1882.—*Director.*

Amulung, Iguig, Peña-Blanca, Tuguegarao, Enrile, Solana, Cordoba, Santa Niño, Piat, Tuao, Manauanan, and Malaueg—situated on both sides of the Rio Grande de Cagayan, of the Rio Chico de Itaves, and the estuaries of the same. These municipalities, being at some distance from the sea, produced a tobacco of good quality and pleasant to the taste, although the quality varies according to the soil properties peculiar to each site and locality. The other municipalities, such as Lallo, Camalanligan, Aparri, Buguey, Abulug, Pamplona, Sanchez Mira, and Claveria, by reason of the influence of the sea, which borders or is near them, yield a tobacco of a very poor quality.

Furthermore, in the municipalities and sections which produce tobacco there is a notable difference between the high and low land product, both in the strength and development of the plants and in the quality of the leaves. An explanation of this may be found in the fact that high land is considered such land as is separated from the rivers and estuaries and is not covered by the waters of the overflow, and low land such fields adjoining the rivers and estuaries as are frequently inundated. Thus, the high lands do not receive the fertilizers which the waters deposit in the low fields or lands, so that the nutritive components which the former contained are gradually consumed, until in time they become exhausted and the land unproductive.

Nevertheless, there is an advantage in the high lands, originally wooded and volcanic, over the low lands during the period of their full productive vigor and force, as a crop is always assured the grower, and there is no fear of an abnormal overflow of the rivers before the crop is harvested. This sometimes occurs in the low lands, destroying plantations, houses, and tobacco storehouses, or covering the plants with water for a period of three, four, or five days, leaving the leaves rotten and worthless.

There are, therefore, different kinds of lands used in the cultivation of tobacco, such as high, argillaceous, and calcareous lands; high lands, originally wood lands, which are volcanic and sandy; fairly high lands, near rivers and estuaries, and low lands. The last named, with the exceptions noted, are the most suitable lands for tobacco, producing the best plants, with exuberant foliage, of good quality, color, and agreeable flavor; next in quality come the fairly high lands, then the cleared wood lands; and then, in the last place, the high, loamy, or calcareous lands. The last two classes of land require artificial fertilization in order to be profitable, while the low lands receive fertilization naturally from the sediment which the waters deposit during inundation.

The Cagayanes have never used fertilizer of any kind in their fields. On several occasions attempts have been made on the San Antonio, Santa Isabel, and Maluno plantations to use artificial fertilizers, but they were unsuccessful on account of the opposition of the Filipino laborers. Up to the present time the ordinary Filipino does not understand the necessity or advantage of using fertilizers.

* The growers on high lands usually fertilize them with carabao or cow manure, which is mixed with the earth in plowing, or, when they have no manure on account of a lack of animals, as is the case at the present time, they use cornstalks, which they permit to rot.

SEED BEDS.

Seed beds are the places in which tobacco seed is sown, and from which the shoots are transplanted to land properly prepared, where the plants develop fully. These seed beds must be on high land, protected from the overflow of the rivers and close to the house of the farmer, in order that the great care which the tender plants require may be given them. Usually a place is selected for the seed bed which is not shaded by trees or houses in order that the seeds may receive the benefit of the winds and of the sun, which they require for their germination, and to prevent the new plants from being weak and delicate. These seed beds are usually made on level land from 40 to 50 feet square, or sufficiently large for double the number of plants which are required. It is surrounded by a small ditch containing water for sprinkling, the earth from which is placed in the middle of the inclosed section for the purpose of elevating it so that the water may drain off. The farmer works this section of land carefully until the soil is pulverized, and sometimes fertilizes it with rather dry manure. It is divided into beds 3 or 4 feet wide, separated from each other by small longitudinal ditches of little depth, in order to avoid the retention of the rain or sprinkled water, which might rot the seed or injure the delicate roots of the tender plants. After the land for the seed beds has been

prepared the seed is scattered in the beds when the land is somewhat moist, either from previous rains or a moderate sprinkling.

Tobacco seeds are taken from the flowers of the strongest and most vigorous plants, which are reserved without topping and left to flower and go to seed. The pods are cut when ripe and placed in the sun to dry in order that the seeds may be easily removed from them. The seeds are kept in earthen vessels in order to protect them against such humidity as would be injurious until the time comes to prepare the seed bed.

Before scattering the seed it is mixed with fine dry sand or ashes in order that it may be properly distributed and separated, and is lightly pressed into the ground with the foot.

Different kinds of tobacco leaves are known, which are the product of several kinds of seed. The common varieties known in this province are Catabacuan, Espada, American or Habana, also known as Isabela, Decorazon, and Vizcaya. The first named, which produces leaves barely 35 to 38 centimeters long, but of an agreeable aroma, has been abandoned, because the plant hardly reaches the height of a meter, giving in proportion to its height a small number of leaves, requiring, in addition, great care, because it is the variety most subject to the ravages of worms. At the present time the only varieties cultivated are Habana or Isabela and Vizcaya, which grow to a height of 1½ or 2 meters, while the leaves are 1 meter or more in length and 50 centimeters or more in width. They produce leaves in proportion to their height and yield more leaves than other varieties without suffering in aroma or flavor, although they are different from the Catabacuan variety.

The season for the preparation of seed beds is governed by the character of the soil to which the shoots are to be transplanted. For high land, with regard to which there is no possibility of inundation, the seed beds are prepared in July and August and the transplanting takes place in September and October, while with low land the seed is sown in October or November and transplanting occurs in December or January.

Careful growers prepare the seed beds from which transplanting is to take place in highlands in soil of the same character, an effort being made to have the soil of the seed bed and that to which the transplanting is to take place identical in quality, in order that the roots may not suffer from a different soil on being transplanted. But unskilled or careless growers do not observe this detail, which is essential to the acclimatization and development of the plants.

After the seeds have been sown, the grower protects them against excessive heat and rain by means of shelters or covers made of bamboo or palm or banana leaves, with which the seed beds are covered from 10 o'clock in the morning until 4 or 5 in the afternoon on very sunny days, or when the rains are heavy and abundant. When the weeds have sprouted, the family of the grower begins to remove them, and also the worms from the tobacco plants. This must be done daily, morning and evening, until the time of transplanting.

During the period of the tobacco monopoly these shelters were prepared, because the employees of the government forced the natives to do so. When they were free, in so far as the cultivation of tobacco was concerned, they immediately abandoned the shelter of the tobacco in the seed beds, and at the present time properly cared for seed beds are seen only on plantations managed by Europeans.

Nor does the native take the trouble to irrigate the seed beds; he simply sows the seed and leaves the rest to Providence.

On very hot and dry days the seed beds should be carefully sprinkled, in order that they may not bake, and if, after they have sprouted, it is noticed that the plants are rather thick or close together, they must be thinned in order to permit the remainder to have sufficient room for development.

Tobacco seed beds should be plowed four times, but the Cagayanes seldom do so more than twice; it would be too much work for them.

A grower who leaves the care of the seed bed to his family is not free from work himself, because after the seed bed has been prepared he begins the preparation of the field to which the plants are to be transplanted, and is obliged to plow the ground two or three times a week for a month until the surface soil is well mixed and almost pulverized.

After forty-five days, or, at the furthest, sixty, when the plants have attained a height of 25 or 30 centimeters, the plants are ready to be transplanted from the seed beds. The plants are pulled with care, not much before or after the period mentioned, because if done before, the roots are weak and have not suffi-

cient strength to develop in foreign soil; and if it be done much later the vertical roots would be injured when the plants are pulled.

The method observed for pulling the plants to be transplanted is to moisten the soil, if the weather be dry, in order that the roots free themselves easily. The most flourishing plants are selected, and with a small stick in the right hand, which is inserted beside the plant to be pulled, it is pressed in the direction of the root, and with a slight effort with the hand, in order that the end of the stick may rise toward the surface, the plant, which is held in the left hand, comes out without resistance, together with its vertical root and horizontal rootlets, without the slightest injury. This work is done during the coolest hours of the day—as, for example, between 4 and 9 o'clock in the morning and 4 and 7 at night—and on moonlight nights it usually takes place between 5 and 10. When a sufficient number of plants for the transplanting in one day has been pulled during the hours mentioned, the plants are well arranged in a basket and covered with banana leaves and taken to the ground which has been prepared for the transplanting.

TRANSPLANTING AND CULTIVATION.

Before transplanting the grower plows longitudinal furrows on the ground, making them deep in high and chalky lands and not so deep in loose soil, with a distance of a meter, more or less, between furrows. Behind the plow usually follows a member of the family, who carries the basket of plants and drops the plants in the furrows one by one, at intervals of 1 meter or 1 vara. He is followed by another member of the family with a sharp stick, with which he makes holes in which he places the plants, leaving all the leaves above the ground, and taking care that the roots and the stalks enter the holes without bending, in order to keep the plants from dying or having a sickly growth. If the ground is quite dry, it is customary to water the plant, taking care not to let the water fall on the leaves, thus breaking them by the weight of the water.

After the tobacco has been transplanted, dead plants are replaced in order that the rows may have the same number of plants and no space be left unoccupied.

Three weeks after the planting it may be ascertained from the vigor and strength of the plants whether they have perfectly taken root in the soil. In such case the farmer passes with the plow in the space between the rows of plants in order to cast up the soil on the portion of the stalk uncovered by the earth.

When it is observed that the leaves which form the top of the plant are beginning to grow, which will be about two and a half months after the plant has taken root in the new soil, it is topped by cutting the buttons in order to prevent it from developing vertically, and at the same time the lowest leaves near the ground are removed in order that the nutritious juice shall concentrate in the remaining leaves, and the soil is again gathered around the stalk of the plant. This work leads to the sprouting of suckers, to which a careful grower gives much attention, removing them when the leaves of the plant have been removed, leaving only two or three of the strongest and most vigorous, which will give good leaves like the plant. With this care the leaves of the mother plant, as well as of the suckers, are gummy and of excellent quality.

Notwithstanding what has been said regarding topping, it must be remembered that the grower does not do this to all the plants, because were he to do so he would be left without seed. When the topping is done some plants are left to grow and blossom, from which the seed is taken, as has been mentioned.

After this comes the hardest work for the family of the farmer—this the removing of the worms which attack the leaves and destroy the plants. This is carried on through the entire field from plant to plant and from leaf to leaf every day from daylight until about 8 or 9 o'clock in the morning, and after sunset in the evening until about 8 o'clock, or even later on moonlight nights. This terrible tobacco plague, by a fatal instinct, selects the best plants and attacks the most healthy and juiciest or gummiest leaves, and sometimes, notwithstanding the zeal and activity of its exterminators, makes great ravages at night when it is impossible to combat them. Some of the more careful growers sacrifice their hours of rest and work at night by the light of torches; but such growers are very few in number, and rich planters usually have this done by their servants and laborers.

Three varieties of these insects are known—the green, which eat the top or crown of the plant; the yellow, which attack the leaves; and the black ones,

which perforate the trunk, causing the strongest plant to fall to the ground. As yet the origin of these insects or a remedy to prevent their ravages has not been discovered.

A small, white moth, flying around at night, deposits its eggs on the tobacco leaves. These bear the worms which feed on the green tobacco. It would be easier to kill the moths at night with the aid of lights, but this is too much trouble for the Cagayanese.

CUTTING AND CURING THE LEAVES.

When the tobacco leaves are ripe, which is known by their yellowish color, they are ready for cutting. The upper leaves ripen first. The method employed for cutting or pruning the leaves of the plant is to take the leaf by the stem with the three principal fingers of the right hand, and with a small downward effort, supporting the plant with the left hand, to detach it without injury. This is done between 8 and 12 o'clock in the morning and 3 and 5 or 6 in the afternoon. It is not advisable to do the cutting earlier or before the dew which has settled on the leaves during the night has evaporated, as this would cause dark-green spots to appear on the leaves and injure their quality.

When the cutting takes place the grower, together with his family, goes into the field with a carabao cart, in which the cut leaves are placed in regular order in a vertical position with the stems downward, so that the points may not be injured. When the cart has been filled the leaves are covered with palm or banana leaves and taken in this condition to the drying shed or to the house of the grower, where they are placed in piles, care being taken that the leaves receive no blow or injury which would leave a spot and deteriorate their quality. The family of the planter places them on sticks or inserts them by the stem in split bamboo about half an inch thick and two or more meters long, which come to a point. A space of a centimeter is left between the leaves, so that when they are placed in the curing shed they may all have equal ventilation, as the leaves which do not receive this would mildew, thus injuring their quality and giving the tobacco a disagreeable flavor. When the leaves have been placed on the sticks they are hung from the roof of the shed with ample space between the rows. No space at all is left between the leaves, but on the contrary as many leaves as possible are squeezed on one stick.

As a general rule curing sheds are not used. About 10 per cent of the growers of tobacco have curing sheds, the others drying their tobacco in the sun until it loses its green color, after which it is hung in the house until sufficiently dry. But there are many who do not wait for it to dry completely, the consequence of which is that it rots and the leaf loses its consistency. Bad and irregular coloring prevails at the present time in Philippine tobacco, due to a great extent to the drying in the sun.

As is known in all tobacco-producing countries, the drying and curing must take place in a dark, shady place, in order that the color may be uniform.

The drying shed has a nipa or cogon roof supported by wooden posts, well raised above the ground, and usually without floor or walls, although some have movable walls of woven bamboo, which may be opened or closed under certain conditions. The dimensions of the drying sheds vary according to the amount of tobacco and the activity and resources of the farmer.

During the time of the tobacco monopoly under Spanish domination the tobacco grower was obliged to build a drying shed at his own expense, in addition to those which the Government built in certain populous barrios. But since the cessation of the monopoly, by which the cultivation of tobacco has become entirely optional with the planter, curing or drying sheds have been disappearing to such an extent that at the present time there are but very few farmers who build drying sheds, supplying the lack thereof with the lower floor of their houses and their porches, and when these are not sufficient they use the upper floors of their dwellings and their kitchens.

The advantages of special drying sheds are the orderly arrangement of the leaves, good ventilation, and the protection afforded during the season of heavy rains.

Sheds without walls, during rainy periods, give the family of the grower work in wiping the leaves with a cloth in order to remove the moisture they may have received. But if the tobacco is cured in the house, the leaves suspended beneath the floor receive all the dust which sifts through; those on the upper floor, on account of the constant movement of the people dwelling therein, frequently receive violent blows which produce spots and defects; while those

hung beneath the eaves are exposed to the sun and rain, which destroy their special quality. It is advisable, according to some planters, that the tobacco leaves be exposed to the sun two or three days before being hung up for curing because they thus get a better color later when they dry, but expert growers are of opinion that this is injurious because it gives them a disagreeable flavor.

The time required for curing the tobacco leaves varies according to their size, the season, and place. Small leaves in drying sheds and those hung under a roof take from fifteen to twenty days, and the large leaves from twenty-five to thirty days; those exposed to the sun dry in a relative shorter time. But during rainy weather the process takes longer, because the humidity prevents the leaves from drying well, and if they are not completely dry, fermentation progresses too rapidly, exposing them to burning, when they become a total loss to the planter.

When the leaves are quite dry the sticks are carefully taken down and placed in piles from 6 to 8 meters square, and of 2 or more meters in height, according to the quantity of tobacco, which also regulates the number of piles. The latter are covered with mats 1.25 meters long and ~~1~~ meter wide, which are placed on the sides and tops. These mats are made of *basta*, the bark of the banana trunk, divided into strips of 8 centimeters in width, which are dried in the sun, made into mats, and used for the wrapping of tobacco.

Every four days the piles are turned—that is, the sticks are turned so that fermentation may be equal in all the leaves.

As it is impossible to judge of the quality of the leaves when they are strung for drying by reason of their freshness and greenness, the persons who do this look only at the size, stringing on the same stick the leaves of one size. After the second turning over the leaves are removed from the stick and are sorted, when they are placed on sticks of a shorter length—1 meter or less long—and are again placed in piles in the manner mentioned, but are turned over every six or eight days until this has been done three or four times.

While the leaves are being piled and turned over they acquire their color gradually, but before they have the desired color the leaves are again taken from the sticks and tied in bundles of ten by their stems, every ten bundles forming a pack, commonly called a “hand.” This is a simple but delicate operation, because in forming the bundles, which are tied with thin strips of *basta*, without separating the ten sets of ten leaves which the stick contains, they are gently smoothed in order to cause the creases to disappear, the stick is withdrawn, and the hundred leaves are carefully rolled, care being taken to keep the borders of the leaves inside. Then the roll is tied with strips of *basta* at three points, one in the middle and one at either end of the hand.

These hands or packs are again piled, and in order to cause them to ferment large piles are made, with the stems of the leaves on the outside, so as to prevent the points of the leaves from being injured. If the piles are square they are left with openings at regular intervals, which are called “*troneras*,” and serve as ventilators to prevent a too rapid fermentation, which would burn the tobacco; if the piles be round or circular, a hole is left in the center.

The number of times these piles, which are known by tobacco planters as “*mandalas*,” should be turned over is regulated by the quality of the tobacco leaves; if the leaves are thick or juicy and gummy and the weather is quite dry the pile is turned after six or eight days, and if it be damp or rainy weather, after ten or eleven days. Fine leaves require two days more, and are turned over two or three times more until the leaves acquire a more or less dark chestnut color.

Tobacco planters and those engaged in the tobacco trade in this province who are familiar with the work of curing the tobacco do not need to know the age of the piles in order to know when they should be turned, because the odor of the tobacco indicates the proper time. When fermentation begins more heat than usual is noticed in the spaces between the leaves when the hand is inserted therein, the degree of heat increasing daily; after four or five days the tobacco gives out an agreeable odor, which becomes accentuated day by day until it becomes almost repugnant. Then turning should take place and not a single day should be permitted to elapse, because of the danger of burning the bundles in the lower part of the pile. After the hands of tobacco have been turned three or four times in the pile they are ready for the market.

We have spoken of the suckers which grow from the plant after it has been topped. In order that these suckers may yield large leaves of good quality, after the leaves have been removed from the stalk the grower cuts or removes all the suckers but two of the strongest and healthiest ones, selected before-

hand, one near the bottom and another about a third of a yard higher; then the stalk is cut at the joint where the sucker grows, in order that the fertilizing juices may properly nourish the leaves and hasten the ripening.

EXPENSES AND PROFITS.

The opinion is general that tobacco is the most profitable crop to the planter in the Philippines. This opinion is confirmed by the high price which this product has brought some years in the Manila market. The high prices which have obtained for two consecutive years, 1900 and 1901, and which will not return in view of the state of the foreign markets, can not serve as a basis for a calculation of the profits. Such a calculation, to be approximate, should be based on the ordinary prices which tobacco brings in the locality where the growers sell their products. The expenses they incur must also be considered, because without this data it would be impossible to judge of the profits.

In order to ascertain these facts—that is, expenses and profits—it is necessary to look into the manner in which the grower or planter of tobacco places his product on the market.

It has already been said that the last work connected with the tobacco leaves is to make bundles of every 100 leaves tied together. Every 40 bundles form a bale, in which form the tobacco is offered for sale.

The price of the tobacco bales is fixed according to the class of the article, or is agreed upon between the purchaser and vender. Formerly, after the cessation of the monopoly, it was lower, but has increased notably and is being maintained at the present time.

Tobacco is divided into five classes, from the first to the fifth, depending on the length of the leaf, absence of spots, and defects, such as breaks or holes made by worms.

The leaves of the first class should be 45 centimeters in length from the stem to the point. Those of the second are 39 centimeters in length, clean and sound, as those of the first. Those of the third class are leaves without spots and defects, 26 centimeters in length. Of the fourth class, the leaves contain some spots, breaks, or perforations made by worms, and are 24 centimeters long, while the fifth class consists of leaves of the same character 22 centimeters long. It should be noted that bundles of leaves having the length of the first class or a greater length, but with six or more leaves having black or greenish spots, or breaks or perforations, are put in the next lower class; if the number of defective leaves exceeds 12, the bundle goes to the third class, and if the number of the defective leaves reaches 20, it descends to the fourth class.

This was the classification under the Spanish monopoly, but at the present time no one pays any attention to it, and the tobacco is classified as the grower may wish. This is due, to a great extent, to the competition in the market. According to a former agreement, fixed prices have been set for each class of tobacco, and these have not apparently changed, but in reality they are changing continually, because if there are few purchasers the tobacco is classified as it should be; but as soon as the demand increases the purchasers do not observe the classification so strictly, and tobacco of the second class is classified as of the first, that of the third class as of the second, and so on. By this means the grower receives a higher price than the customary one.

With the data mentioned, the expenses and profits may be shown, taking as a basis 1 hectare of land.

One hectare of low land is valued at \$200 at the lowest, and of high land at \$100.^a

In order to properly prepare the land for the seed beds it should be plowed several times. This necessitates the labor of 1 person with a carabao for two days, at \$1 per day.

The preparation of a hectare of land, by plowing several times in different directions, requires the labor of 1 man with a carabao for twelve days, which, at 1 peso per day for the man with his carabao, would amount to \$12 Mexican.

For sowing or transplanting seeds in 1 hectare of land, 3 men and 1 carabao are necessary for five days, which, at 50 cents per day per man and carabao, amounts to \$10 Mexican.

As has been already stated, the tobacco plants require great care on the part of the grower, if he wishes to see his hopes realized. This care must be con-

^aAll money values are expressed in Mexican dollars (or pesos), the local currency in the Philippines.—*Director*.

tinuous and varied during development, beginning with the removal of foreign growths, which might deprive them of some of the fertilizing juices, then the hilling of the plants, afterwards the extermination of the worms, the last work being the most laborious one, but of the greatest importance to the grower. Supposing that 4 men are employed on this work five hours per day for a period of forty days, each one earning $31\frac{1}{2}$ cents per day, the amount would be \$50 Mexican. This would not include the work of topping the plants, the removal of the suckers which grow after the topping and of the leaves which are on the stalk and touch the ground.

For the gathering of the leaves 4 men are necessary, with 1 carabao and wagon or cart. They are engaged for three days each during three seasons at the rate of 50 cents per day per man and 50 cents for the carabao, the total amounting to \$22.50 Mexican.

As the leaves are cut from the plants they are placed in the cart, covered with palm or banana leaves, and transferred to the house, where they are received by 4 women, who sort them according to size. After they have been sorted they are placed on sticks or on split bamboo 1 centimeter in thickness with a pointed end, and after a sufficient number of leaves have been placed thereon, with the spaces between them which are necessary for ventilation, the stick is hung in the place set aside for the curing. This work takes as long as the gathering, and estimating the daily wage of each workwoman at half a peso Mexican, the sum total of the wages for the four women during the nine days would be \$18 Mexican.

When the sticks are taken down from the drying shed they are placed in piles. For the piling of the leaves of 1 hectare of land it is necessary to employ 4 persons for three days each, whose wages, at 50 cents per day, would amount to \$6 Mexican. We do not consider the work of turning the piles, which is done once, twice, or oftener, according to the care and diligence of the grower.

After the turning comes the laborious and delicate task of selecting and separating the leaves into classes. This operation is one for women exclusively, and supposing that in one day 25 women are engaged, and that in addition to the classification of the leaves they tie them by tens by the stem and string each ten bundles on another shorter stick, the wages would be 50 cents each, or \$12.50 Mexican.

In order that the tobacco may be in proper condition for the market another operation is necessary. This consists in dampening the leaves to give them some elasticity, so they will not break when smoothed and ironed. The hundred leaves contained on each stick are removed and fastened in three parts, in order that they may not become untied in turning. If it be supposed that 25 women are sufficient on this work for one day, at 50 cents each per day, which is a low estimate, the amount would be \$12.50 Mexican.

The hands are again piled and the piles turned over two, three, or four times in order to avoid a rapid fermentation, which would result in burning the tobacco. Supposing that four turns are given to the piles, which is the usual number necessary, and each turning be done by 2 men in two days, the wages would be \$8 Mexican.

These expenses are incurred by a tobacco grower in cultivating 1 hectare of land, and do not include the interest on the estimated value of the land.

In order to ascertain the profit to the tobacco grower the following high estimates are made: It is first considered that 10,000 plants have been transplanted to 1 hectare of land; second, that 20 leaves have been gathered from each plant—that is to say, 12 from the plant and 8 from the two suckers which ought to be left—giving a total of 200,000 leaves gathered from the 10,000 plants, which, reduced to bales containing 40 hands, and the hand 100 leaves, would make 50 bales of the 200,000 leaves from the 10,000 tobacco plants.

The price of a bale of tobacco, according to class, is determined and fixed by custom, which is changed with difficulty; so that in the deal for the sale of this article the purchaser and vender do not speak of the price, because it is taken for granted that it is the market price, and consequently the agreement is confined to the classification and amount.

An explanation having been made of the classification of tobacco leaves, their prices per bale are: For first class, \$14.25; second, \$9; third, \$4.12 $\frac{1}{2}$; fourth superior, \$2; fourth current, \$1.50; and fifth, \$0.50.

Supposing that 200,000 leaves gathered would yield 50 bales of 40 hands, and supposing that of these 50 bales one is of the first class, three of the second, six of the third, twenty of the fourth superior, twelve of the fourth current, and eight of the fifth class, and that the leaves of the fifth class are raised to the

fourth current in order to increase the value of the crop, nevertheless, if it is desired to ascertain the exact and true value at 50 cents per bale of the 20 bales of the fourth class above mentioned, an exact proportion must be secured.

Expenses and income are summed up in the following table:

Expenses and income to the grower of tobacco for 1 hectare of land.

EXPENSES.

Wages of 1 man and 1 carabao for 2 days, for the preparation of the seed bed, at 50 cents per day for the man and the same amount for the carabao	\$2.00
Wages of 1 man and 1 carabao for 12 days' labor in preparing 1 hectare of land, at the rate of 50 cents per day for the man as well as the carabao	12.00
Wages of 3 men and 1 carabao for 5 days, for sowing or transplanting, at 50 cents each per day	10.00
Wages of 4 men, for the cleaning and care of the plants, at the rate of 31½ cents for 5 hours' work per day	50.00
Wages of 4 men and 1 carabao with a wagon for 9 days for the gathering of the leaves, at 50 cents per day each, as also the carabao	22.00
Wages of 4 women, at 50 cents per day, for the sorting, placing on sticks, and in the drying shed of the tobacco leaves, for 9 days	18.00
Wages of 4 women, at 50 cents per day, for 3 days, in piling the sticks of tobacco after curing	6.00
Wages of 25 women, at 50 cents per day, for classifying and making of bundles, for 1 day	12.50
Wages of the same, at 50 cents per day, for ironing and formation into bundles, for 1 day	12.50
Wages of 2 men, at 50 cents per day, for turning the piles four times, at the rate of 2 days for each time	8.00
Total	153.00

INCOME.

Proceeds from tobacco leaves from 1 hectare of land:	
Of the first class, 1 bale	\$14.25
Of the second class, 3 bales	27.00
Of the third class, 6 bales	24.00
Of the fourth superior class, 20 bales	40.00
Of the fourth current class, 12 bales	18.00
Of the fifth class, 8 bales	4.00
Raising to the fourth class current the 8 bales of the fifth class, the increase is	8.00
Balance in favor of the expenses	17.75
Total	153.00

The calculation regarding the cost of the amount of tobacco cultivated in a hectare of land is entirely misleading, because in no place in the province of Cagayan is there a planter who works his lands with paid labor; furthermore, it would be absolutely impossible to cultivate tobacco in this manner and obtain positive results—that is to say, as long as the necessity exists of employing native laborers. The reason for this is that the native does not work for less than 75 centavos, or 1 peso, per day, and as he is so lazy, he works only two or three hours in the morning and a similar period in the afternoon.

The grower usually prepares his seed beds without assistance, and when the time for plowing comes he calls upon five or six of his neighbors, all of whom come with their plows and carabaos, and in a few hours in the mornings and afternoons, for a few days, prepare the beds for the reception of the small plants. For the purpose of effecting the transplanting they call upon the women and children of neighboring families, and this work is also done in a few days. They thus assist each other, but without spending a cent. Upon the conclusion of the transplanting the man does nothing more, leaving the care of the field to his wife and children. The cutting of the ripe leaves is also left to them. At the cutting period all the man does is to transport the cut tobacco

to his house by wagon, where all the other work of piling, curing, etc., is done by the women.

The grower pays nothing for help, and the money that he receives from the sale of his tobacco is considered by him as clear profit, as indeed it is.

It is very rarely the case that a hectare produces 50 bales. This result may be obtained only by using the shoots, but as their leaves are very small they have hardly any value and are never classed above the fifth class. In well-cultivated lands where the plants receive the proper care a plant does not yield more than 15 leaves, and one hectare would thus yield 37 bales and 20 hands.

In the crop of 1903 the proportion of the different classes of tobacco produced in the province of Cagayan was as follows:

First class, 1.2 per cent, or in a crop of 50 bales, 0 bale 24 hands.

Second, 3.1 per cent, or in a crop of 50 bales, 1 bale 22 hands.

Third, 6.5 per cent, or in a crop of 50 bales, 3 bales 10 hands.

Fourth superior, 11.7 per cent, or in a crop of 50 bales, 5 bales 34 hands.

Fourth ordinary, 31.1 per cent, or in a crop of 50 bales, 15 bales 22 hands.

Fifth, 46.4 per cent, or in a crop of 50 bales, 23 bales 8 hands.

If the tobacco is cultivated as it should be, it is an easy matter to secure in 50 bales—3 bales of the first class, 5 of the second, 8 of the third, 10 of the fourth superior, 19 of the fourth current, and 5 of the fifth. During the last year of the monopoly, 1882, the Spanish Government sold the first class in Manila at \$112 per quintal, when exchange on London was at 4.01; now a quintal of the first class brings hardly \$30 Mexican. All this is due to the great carelessness of the grower.

In the above estimate it has been indicated that the number of leaves of tobacco for 1 hectare of land is 200,000, equivalent to 20 per plant; but this is rarely the case, because the plants do not all attain the same height, nor do they all have the same number of leaves, and even if this were so it would be impossible to avoid some being injured and rendered useless. A more correct estimate would be 15 leaves per plant, in which case the result would be 36½ bales.

The estimate is also high regarding the classification, because ordinarily in a crop of 50 bales there is not found one of the first class nor three of the second, although the proportion of the other grades is frequently found in a number of bales of this size.

After the growers have sold their tobacco, the buyers, in order to increase their profits, are obliged to incur other expenses for the purpose of improving the quality of the tobacco, or at least to preserve the quality it had when bought, as also the expense of packing it for transportation.

This work consists in making piles which are covered with mats, so that the tobacco may ferment and get a better color. The piles are turned two or three times, according to the condition of the leaves, in order to dry them sufficiently before packing to prevent fermentation after packing.

When the tobacco is ready for packing, the merchant or trader again sorts and grades it to suit himself, but always endeavoring to improve the class, because if he retains the grades as he bought them, a loss would be inevitable.

After classification, the tobacco is again piled according to classes, and the packing is proceeded with, every 3 quintals or 2½ hands of tobacco being wrapped in two mats and pressed into a bale of a quadrilateral shape 1 meter and 10 centimeters long, by 70 or 80 centimeters high, and tied with split bamboo from end to end and crosswise.

After the packing is completed, the bales are either stored or hauled to boats for transportation to the port of Aparri, where they are loaded on ships for Manila.

In brief, all the expenses of the trade, including the improvement and packing of the tobacco purchased, the transportation of the bales from the warehouse to the river and to Aparri, the unloading at that point, and storage if there should be no vessel in port for Manila, transportation to the vessel, freight from Aparri to Manila, cost of marine insurance, unloading and storage in Manila, fire insurance, and sale commission, if the tobacco is not sold on board, are estimated at \$7 per bale of 2½ or 3 quintals.

The weight of the tobacco depends on its quality, so that tobacco of the first class has more weight than that of the second, and so on.

Thus, a bale of 40 hands of tobacco of the first class varies between 50 and 60 pounds; of the second class, between 40 and 50 pounds; of the third class, between 35 and 40 pounds; of the fourth superior class, almost the same as the third class, because the defective leaves of the superior grade are included

in it; of the fourth current class, between 30 and 35 pounds; and of the fifth class, between 20 and 30 pounds.

The weight varies according to the quality of the crop and according to the classification and competition. The weight of the crop of 1903 gave the following results: One bale of the first class, 50 pounds; second class, 45 pounds; third class, 34½ pounds; fourth superior, 34 pounds; fourth current, 20 pounds; and fifth, 11 pounds.

When 50 bales of the best qualities of tobacco (from first to third grade, inclusive) represent a third part, more or less, of a crop, it can be estimated at 5 bales per quintal of one class or another (from first to fifth grade), and, therefore, from the 50 bales 10 quintals are secured, which, sold at \$20 per quintal, amounts to \$200; but the price of tobacco in the Manila market fluctuates according to the demand. At the present time it barely brings \$15 per quintal.

Due to the depreciated value of tobacco in the Manila market, there is a scarcity in the province of dealers in the article, and although there still remain here the agents and buyers for the mercantile houses, who engage in the purchase of tobacco from the growers, the absence of other buyers injures the interests of the growers to a notable extent, not on account of the reduction in price of the article (which, being fixed and standard, can not be changed), but due to the low classification of the tobacco, on account of lack of competition, which is more prejudicial than the reduction in price, by reason of the great difference in the value of one grade as compared to another.

The growers or planters of tobacco are convinced that the cultivation of tobacco brings them more profit than any other agricultural product, because they take no account of the money invested in the land or its exhaustion from continued planting, or the work of the carabao, or that of the members of their families or the relatives, neighbors, and friends who assist them, because such work is repaid in kind. When their carabaos die, or when they have none, or when they have no money for their necessities, they apply to Chinese or Filipino traders for a loan of money at an interest of 50 per cent, payable in tobacco at harvest time. They do not consider the high interest, provided they satisfy their necessities, no matter how puerile they may be, because they expect to pay both the loan and interest with the proceeds of their next crop; but sometimes the crop is lost through accident, and at other times it is small, and the creditor does not wish to extend the time of payment, hence this expectation is not realized, and the tobacco grower is obliged to give up his lands in liquidation of his debts. From this it may be inferred that the tobacco farmers are not always intelligent in regard to their financial interests, because there are other products which are easily cultivated, such as abaca, cacao, coffee, magney, cotton, cocoanuts, corn, wheat, and potatoes, and which, even if they do not yield very large profits, give at least something in remuneration for their work.

Hemp, cacao, magney, and cocoanuts can not be cultivated in Cagayan on account of existing conditions. Coffee grows well. Corn also grows well, and constitutes practically the only food of the natives. Wheat and potatoes may be grown during the winter months, but they require here much more care than in cold climates, and the Cagayan is not fond of work.

It would be regrettable were the cultivation of tobacco, which figures among the valued products of the Philippines, such as sugar and coffee, to disappear from Cagayan, and before the day comes for its abandonment it is urgently necessary that efficient measures or remedies be adopted tending to alleviate the present painful situation.

Never as at the present time have so many misfortunes joined together, each of which threatens to exterminate the Philippine planters in general, and the grower of tobacco in Cagayan in particular. The rinderpest, which has been prevalent in the province for some years, has visited all the townships and exterminated the carabaos and other cattle. Horses were similarly attacked by surra, and between the two diseases the cattle of certain districts were gradually destroyed, and if any carabaos are found it is due to the fact that they have been purchased recently. Then came the drought, which cracked the earth and burned the plants; then the locust plague, which visited all the districts and plantations, cleaning out all vegetable growth; and finally, to supplement these misfortunes, came smallpox, dengue, and cholera.

A remedy suggested is the establishment of an agricultural bank, to lend money to the farmers on mortgages at a moderate interest of, say, 6 or 8 per cent per annum. This bank could engage in the tobacco industry, both as a means to assure payment of its credits as well as to improve the price of the article and destroy the monopoly of the commercial companies. For this purpose

the bank should have agents and branches in the markets of Europe and America, for the exportation of tobacco and for the importation of rice and other articles needed by the inhabitants of the province.

In order to supply the lack of work animals and to provide against droughts the bank could engage in the work of irrigating the fields to be used in the cultivation of tobacco and cereals, of bringing in plows and portable irrigation pumps, and of working the fields for a small compensation in money or crops.

The only purpose of these brief suggestions is to indicate the remedy considered efficient to alleviate the infinite number of misfortunes which the farmers suffer, but no doubt is entertained that other and better methods could be found by persons more expert on the subject.

In conclusion, it may be said that the province of Cagayan, according to the last official guide of 1896, has an area of 1,438,000 hectares, without including the Batanes Islands. This vast area is inhabited by 133,839 Christians, according to the census, without counting the Batanes Islands or the non-Christian tribes of Igorots and Negritos, who live in small settlements on the mountain sides, their number being estimated at 13,414.

Owing to this small number of inhabitants agriculture has remained stationary. For the development of this source of wealth it is advisable to encourage the immigration of the inhabitants of Ilocos Norte and of other populous provinces where suitable land is scarce. In this manner the cultivation of various products would become more extended, and the civilized towns would increase and encroach upon the territory of the savage tribes until the latter are reduced to civilization.

The building of a road in the central range which separate Cagayan from Ilocos Norte will be a valuable factor toward the immigration of natives of that province who have no land to work nor woodland, and who would be very glad to come to Cagayan were it not for the expense of the journey via Laoag and the port of Aparri.

Another means which, if it will not promote immigration, will at least attract people, is the establishment of a railway traversing the province of Cagayan from south to north. With the influx of strangers agriculture would flourish, the markets of this province would become more active, industry and commerce would rise from their state of prostration, while the culture and experience which the natives of this province would derive from their contact with people of different provinces would no doubt create many new necessities, and would in that way stimulate the sources of wealth.

[Same Hearings Page 225.]

STATEMENT OF A. DETERMANN, MANILA, P. I.

Memorial regarding the Philippine tobacco industry and the Dingley tariff.

* * * * *

Up to the abolishment, in 1882, of the Spanish Government's tobacco monopoly in the Philippine Islands, whereby the planting, harvesting, curing, etc., was carefully supervised by the Government officials, the Philippine tobacco has been held in high esteem in many parts of the world, and Manila cigars were generally much appreciated for their fine quality. While the exercise of this monopoly certainly caused unjust hardships on the natives, the good reputation of the Philippine tobacco was preserved during that time. Since then its quality has slowly but steadily decreased, partly because of the apathy shown by the native farmers, partly from lack of encouragement, and also in consequence of bad seasons, wars, etc.

The above refers to the product of the Cagayan and Isabela provinces, i. e., the territory known as the "Cagayan Valley," which is the only district coming into consideration for better-class tobacco. In fact, in all the other islands of the archipelago but in Luzon the monopoly was not in force, a proof that the other regions were known to produce only an undesirable leaf. The yearly production in Cagayan and Isabela may amount to about 200,000 to 300,000 quintals per annum, according to the results of the crops, one-half of which in

good years, as consisting of good to middling quality, may have been suitable for cigars.

The other provinces of Luzon where tobacco is grown are Union, Abra, and the Ilocos, and a little in Pangasinan and Batangas; but the value of these grades does not surpass those grown in the southern islands (Panay, Cebu, Masbate, Negros, etc.) by reason of climatic conditions, those of the soil, etc., and their geographical situation. These inferior grades are almost entirely used for cigarettes smoked in the Philippine Islands. A very small part is exported. The trade does not pay well for common tobacco, wholly unfit for cigars, as grown in those districts. The product in all the above-mentioned provinces except Cagayan and Isabela may be from 200,000 to 300,000 quintals, so that the entire production of tobacco in the Philippine Islands does not exceed 500,000 to 600,000 quintals per annum (50,000,000 to 60,000,000 pounds, of which not more than, say, 10,000,000 to 15,000,000 pounds may, in the case of a good crop, be worked into cigars).

Statistics of exports of the raw products since 1891 (giving quantities only) will be found in Appendix 8. Statistics of exports of manufactured and unmanufactured tobacco (giving values only), since 1901 (figures for previous years not being available), will be found in Appendix 9. In this connection it may be observed that during the year ending June 30, 1901, the United States paid for Cuban tobacco about \$9,700,000 gold, and for Sumatra tobacco about \$5,600,000 gold. The whole export of tobacco, manufactured and unmanufactured, from the Philippine Islands amounted in the same year to about \$2,200,000 gold, whereof the United States took about \$5,000 gold worth, equal to about one-fourth of 1 per cent. Further particulars about the history of the Philippine tobacco and description of its cultivation may be found in Farmers' Bulletin No. 5, Cultivation of Tobacco, by Clarence W. Dorsey, published by the Manila bureau of agriculture. (See page 881.)

There are still a few plantations in the Isabela Province under intelligent supervision, where the cultivation to the extent of, in all, perhaps 20,000 to 25,000 quintals, equal to 2,000,000 to 2,500,000 pounds, is carried out in the proper manner, and consequently the leaf produced there represents generally a good quality, though the greater part is of a fat, gummy nature, not suitable for cigars. With this exception tobacco culture in the Philippine Islands is entirely in the hands of natives, i. e., individuals.

The soil of the tobacco lands in the Isabela Province is fairly heavy, limy, and rich in decayed vegetable matter, left on the land during the rainy season by the rivers, which overflow their banks, flooding the country often 2 or 3 miles from the original bed of the river. This province would certainly produce a finer leaf if the cultivation were practiced on a scientific plan and if the labor problem did not place an obstacle to such an undertaking. At the same time it is only doing justice to the native if we say that he has found little encouragement for his work during the last years and that he also met with enormous adversities of force majeure character, which have been diminished the relative energy formerly shown in producing a good well-cured leaf.

The Spanish market has been practically lost since the American occupation of the Philippine Islands, for during the former régime the tobacco monopoly in Spain was obliged by the Government to buy a certain quantity of Philippine leaf, for the maintenance of which clause there is naturally now no particular reason. In former times Philippine tobacco was also exported to Holland and Belgium, but the demand there has to-day diminished to about nil. Then the Japanese and Australian markets were closed through protective tariffs established in those countries, and Hawaii ceased to buy Manila cigars since its incorporation to the United States and the consequent operation there of the Dingley tariff. The outlet for the Manila cigar was then limited to the domestic consumption and to the demand in China, India, and Europe, which is now very small indeed, owing to the competition of cheap German, Dutch, and Burma cigars.

If ever an industry has intensively suffered it is ours. The war and its consequences, the widespread rinderpest (destroying far more than 50 per cent of the draft animals (carabaos), whose value has since increased by 400 to 500 per cent), cholera, and locust invasions have dealt out such severe blows upon tobacco agriculture in the Philippine Islands that people in those districts were left in the greatest distress. But not enough, even nature failed to assist them in their misery; unfavorable seasons did their share during several consecutive years, and caused the product to be of poor quality and therefore of less value than before.

All this happened during a time when the cost of living became daily more expensive, without those farmers gaining an equivalent in a rise of the price for their product; also as regards the inferior grades worked into cigarettes for home consumption, as the people were unable to pay more for their smoking supply than before. There is a report from Governor (of the Cagayan Province) Gonzaga with the Census Bureau, giving a very graphic description of the condition in that province, which also applies to the Isabela Province. It is shown there that the average native farmer derives no profit whatever from his yearly work and that of his whole family and his carabao, i. e., he fails to include this labor in his calculation, and so he imagines that he obtains a profit from his toil. If a native farmer produces annually 20 to 30 quintals (1 quintal=46 kilos, or about 100 pounds English) of tobacco on his piece of land and received to-day perhaps \$7.50 gold per quintal on the average, he may consider himself very fortunate. In the other provinces the individual may raise a larger crop, because the ordinary leaf, totally unfit for cigars, requires less care, but this tobacco, on the average, does not fetch more than, say, \$4 to \$6 gold per quintal. Now, these \$150 gold to \$225 gold, which are to give him and his family their daily bread, to clothe them, to feed his carabao throughout the whole year, and to include an amortization on the value of his land, his carabao, his tools, the cost of seeds, payment of taxes, etc., are they not inadequate for this purpose?

In 1900 the average price for the Isabela leaf (filler) was \$15 to \$20 gold per quintal, which was considered as exceptionally high. If former prices did, on the average, perhaps, not exceed to-day's values, it must be remembered that in those times the same money was worth twice or three times as much as to-day in the island. There is no exaggeration in the assertion that the people are almost if not actually starving. They can not from one day to another turn to another branch of agriculture, as Senator Dietrich advised them to do. Such an undertaking requires money to start with, and they do not possess even the money for their most urgent wants. They are in desperate need of help, and this it is hoped may be attained by favorable legislation on the part of the United States Congress.

The cigar laborers have already repeatedly appealed to Congress for an improvement of their situation, and stated the details about the circumstances that brought about their misery. Unfortunately the state of affairs which has now become more and more acute has had as consequence several strikes since 1902 without the manufacturers having been able to accede to the demands for higher wages on part of the laborers, with the exception of an increase of about 10 per cent which was granted two years ago. By the recent change of the currency in the Philippine Islands their wages have again found an accidental increase of about 10 per cent. The constantly receding trade offered no possibility for the manufacturers to go any further in this respect, though they fully recognize the misery in which the laborers were placed through the enhanced cost of living. They can not to-day even employ half of the number of men and women who would gladly work for the present wages. And this is, excepting a few other industrial establishments, as a match and a hat factory, the only industry in the islands, having given an honorable existence to a great number of people, not only to the workmen, but also indirectly to the planters.

The number of work people, male and female, employed in this industry in the Philippine Islands may to-day amount to about from 12,000 to 15,000, while in former times there were almost double this number in the same capacity. Reckoning the whole number of people, workmen and planters, in Cagayan and Isabela only, with their families, all of whom are directly affected by this deplorable state of affairs, we may take 300,000 to 400,000 as an approximate estimate.

The balance sheets of the different companies engaged in this trade in Manila must have indicated very poor results during the last years, and as far as those concerns are considered whose shares are quoted in the open market the values of the latter demonstrate rather strikingly the above-stated condition of the industry. Quite a number of cigar factories have been closed during the last years, and some others are in such a poor state that they are not supposed to survive many months to come under the prevailing circumstances.

First of all, from the geographical configuration of the Philippine Islands it is easily seen that there exists only a small area in the archipelago in a distance of more than 20 to 30 miles from the seacoast, and therefore not exposed to the

damaging influence of the saline sea breezes. It is well known that any tobacco grown near the sea has poor combustibility, and is therefore wholly unfit for cigars. For this reason all of the Philippine Islands except Luzon and Mindanao can not grow exportable tobacco, i. e., tobacco of an acceptable quality. As far as Mindanao is concerned, this island possesses several large valleys with alluvial soils that could undoubtedly be made to produce a good quality of tobacco, but this island is still almost entirely unexplored. Besides, even supposing that one could find laborers to go there to deforest the land and cultivate tobacco (the present population, the Moros, is certainly too indolent for such an undertaking), there would have to elapse a period of twenty to thirty years before we would see any Mindanao tobacco. As for Luzon, there are still some small regions which could perhaps be used to advantage for tobacco culture, in so far as the distance from the sea is concerned, but the larger portion of this country is mountainous, while lowlands, preferably with the periodic overflow, are needed to produce a desirable leaf.

And it is not only this; the soil must be specially apt for this agriculture and the rainfall not exceed a certain limit, etc. While, as we said, the Cagayan Valley, or more particularly the Isabela Province, combines all the favorable conditions for the production of tobacco of good quality, there is no district in all Luzon which could be compared with the former in the said respect. In Isabela the cultivation of tobacco may be still extended, but to a very small degree, as nearly all desirable land is already under cultivation. (Compare reports of the Civil Commission for confirmation of this statement.)

* * * * *

The crops of the last four years in the Cagayan and Isabela provinces have been notoriously deficient in quality, and the little that was available for producing good and middle-class cigars has now been partly used up and is partly still in the hands of some manufacturers in Manila, so that, for instance, to-day there are very likely not more than 20,000 to 30,000 quintals in Manila and still in provinces which may be worked into good cigars. The greater part of the tobacco of the last crops has been dark and of thick leaf, and could only be used for cigarettes and also for cigars for consumption in the Philippine Islands, where the public are not so delicate in the choice of their smoking supply, as long as the prices thereof are within the reach of their pockets.

Then there is the great labor question, the much-discussed point in commercial and agricultural life in the Philippine Islands, and the obstacle to any great enterprises looked for in vain during the past years. The importation of Chinese laborers, skilled or unskilled, is prohibited by law, the same as in the United States, so there is no possibility of securing cooly labor from outside. We depend entirely, exclusively, on Filipino labor. About the latter much has been said and written and, as alluded to above, there seems to exist some divergence of opinions regarding the true value of this labor.

Experience in the Philippine Islands has proven that there has always existed the greatest difficulty in securing efficient labor for all kinds of commercial and industrial establishments, which otherwise would to-day exist and flourish.

The average Filipino likes to stay at his home, on his own piece of land, in his native village and province, and is most averse to changes. He will not plant tobacco in Cagayan and to-morrow rice in Pangasinan or sugar in Negros. The majority of the population are farmers, and the welfare of the country lies essentially in its agricultural prosperity. (About 95 per cent of the export of the Philippine Islands are agricultural products.) The best proof for their conservative character is that to-day, under the present ruinous conditions for the tobacco culture in the islands, the natives of the respective districts will not leave their homes and try some other part of the archipelago; they will not even cultivate other products on their present land, except the little corn or other victuals for their own needs. They are not restless, but content if they are left alone and can derive the means for the necessities of life from the product of their labor. But the majority will not overwork themselves and only a few will try to save money, either for themselves or for their children. Their work is by no means comparable with the assiduity of the Chinese, as some people in the United States still believe. The average Philippine native is also physically not strong enough to stand prolonged and severe field work.

As to the wages, they are certainly lower than those paid in the United States, in harmony with the different standards of life, but does not the American farmer or workman produce the same amount of work as two or three Filipinos? Besides, the American laborer works in the temperate zones, where the efficiency of labor is naturally greater than in a hot, enervating climate.

As far as the Filipino cigar laborers are concerned (there is not one Chinese cigar maker in Manila to correct a false statement made to the contrary) their work is satisfactory on the whole, and it is relatively quite a large number of people who have learned this particular branch of work. The present number of cigar makers in Manila (i. e., people who actually make the cigars, not other laborers engaged in the industry), may be 8,000 to 10,000 men and women, of whom, say about one-half, know how to make Cuban style cigars (spiral wrappers). The others, mostly women, produce only Philippine style cigars (straight wrappers). This number of Cuban style cigar makers could perhaps be increased to 7,000 or 8,000, not more, because there are no more people available who have been taught this profession, and it is well known that it requires many years before a man gains sufficient practice to make a well-rolled cigar of the Cuban style.

There is no "cheap labor" in the Philippine Islands, taking the efficiency into consideration, as must necessarily be done. Moreover, with a better sale of our cigars the present scale of wages would not be maintained, but would have to undergo a considerable rise; just by how much the writer would, for obvious reasons, rather abstain from guessing.

* * * * *

Here the following circumstance deserves special mention. Manila hemp abaca is an article which can not be produced anywhere in the world except in the Philippine Islands, and its demand is steadily increasing; now, if such a plan as proposed by Senator Dietrich were practicable, why have not all Filipinos already gone to produce hemp only? It is frequently asserted that there are still vast territories in the provinces of Albay, Camarines, and the Southern Islands where the abaca plant is found in abundance, but allowed to rot for want of labor. Wages of several dollars a day are paid in those districts to people who will prepare the fiber for the market, and still labor is lacking. Why is there no rope factory of importance in the Philippine Islands, considering that the raw material grows there? Because there is no such thing in the Islands as cheap labor. The labor to-day available there is, generally speaking, worth no more than it is paid for, and sometimes considerably less.

* * * * *

APPENDIX 4.

Rates of import duty.

1. In the United States, under the Dingley tariff:

(a) On tobacco—	
Stemmed—	
Wrappers.....	per pound...\$2. 50
Fillers.....	do..... . 50
Unstemmed—	
Wrappers.....	do..... 1. 85
Fillers.....	do..... . 35
(b) On cigars—	
Stemmed.....	do..... 4. 50
Unstemmed.....	per cent ad valorem.. 25

2. In the Philippine Islands:

(a) On tobacco (wrappers and fillers), 50 cents United States currency per kilogram=about.....	per pound... . 22½
(b) On cigars, \$2 United States currency per kilogram=about.....	per pound..... . 91

APPENDIX 5.

Estimates of the annual production, export, and domestic consumption of Philippine tobacco.

Production (in good years) :	Quintals.
Cagayan-----	120, 000-150, 000
Isabela-----	110, 000-130, 000
Union-----	80, 000- 90, 000
Ilocos Norte and Abra-----	40, 000- 50, 000
Barill-----	80, 000-100, 000
Other Visayas-----	70, 000- 80, 000
Total-----	^a 500, 000-600, 000
Used as follows:	
1. Exports:	Quintals.
Leaf tobacco (all kinds)-----	^b 190, 000
Cigars (all Isabela and Cagayan, including Filipino style cigars), say 120,000,000 at 30 pounds, including stems and waste, per 1,000-----	36, 000
Cigarettes (as per statistics of Bureau of Insular Affairs), valued at \$20,699, at say \$15 per 1,000 packages, 1,380,000 packages of 90 pounds per 1,000-----	1, 240
All other manufactured tobacco (as per same statistics)-----	1, 170
Total exports-----	Quintals. 228, 000
2. Local consumption:	
Cigars (all Isabela and Cagayan), say 50,000,000, at 30 pounds per 1,000-----	15, 000
Cigarettes (former output, i. e., before enactment of the internal-revenue law; all kinds of tobacco), about 332,000,000 packages at 90 pounds per 1,000 packages--	299, 000
Local consumption, total-----	314, 000
Total used-----	542, 000
* * * * *	

APPENDIX 11.

Details about the Philippine tobacco trade.

2½ acres=1 hectare.

1 quintal=46 kilograms=101.41 pounds English.

1 mile=1.609 kilometers.

There are about 50 to 60 cigar and cigarette factories in the Philippine Islands between large and small establishments, those of more or less importance being La Insular, Flor de la Isabela, Germinal, El Oriente, Paz y Buen Viaje, Alhambra La Yebana, Alejandrina, Maria Cristina, Urania, Union La Rosa, Aguila Real, Comercial, etc.

Philippine tobacco (good quality for cigars) costs in Manila to-day, say 10 to 20 cents (United States currency) per pound for filler and 15 to 30 cents per pound for wrapper.

The present prices of Manila cigars are the following:

Filipino-style cigars (straight wrappers), not exportable to the United States, weighing 10 to 18 pounds per 1,000, prices per thousand, \$6 to \$12 (United States currency).

Cuban-style cigars (spiral wrappers), weighing 15 to 30 pounds per 1,000, prices per thousand, \$12 to \$15 (United States currency).

A middle-sized cigar weighs about 18 pounds per thousand and costs to-day about \$25 (United States currency) per thousand. The amount of leaf used for

^a 50,000,000-60,000,000 pounds.

^b 19,000,000 pounds, whereof about 10,000 quintals (1,000,000 pounds) is wrapper; 40,000 quintals (4,000,000 pounds) filler, and 140,000 quintals (14,000,000 pounds) ordinary leaf.

such cigar is about 30 pounds per 1,000, i. e., unstemmed leaf and including the waste.

The cigar-maker's labor is to-day paid for from \$2.50 to \$12.50 (United States currency) per 1,000 Cuban-style cigars; the labor on the 18-pound cigar is \$5.50 to \$6 (United States currency) per 1,000. A cigar-maker's foreman receives to-day about \$20 to \$30 (United States currency) per month. A native overseer or technical manager in the cigar factories in Manila receives from \$75 to \$150 (United States currency), and in the larger establishments some employees of this category earn considerably more. The wages for packers and similar workmen are about \$13 to \$15 (United States currency) per month on the average; the ordinary laborer, if paid by the month, receives from \$10 to \$15 (United States currency).

All these wages are considerably less than the rates which should be paid to them, as compared with former wages (about 20 per cent less), taking in consideration the enhanced cost of life, say by about 100 per cent or more.

Cuban-style cigars are fine specimens of workmanship, the wrapper being applied to the cigar without gum, except at the top by a bit of gum, the spiral of the wrapper making only four to five rounds.

Filipino-style cigars are ordinary cigars, the wrapper being applied to the cigar with a big supply of gum, in a straight manner, i. e., not spiral. A skilled workman can produce in a day 100 to 125 Cuban-style cigars, whereby he may gain about \$15 to \$19 gold per month on the average.

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APPENDIX 14.

THE GOVERNMENT OF THE PHILIPPINE ISLANDS,
DEPARTMENT OF THE INTERIOR, BUREAU OF AGRICULTURE,
OFFICE OF THE CHIEF OF BUREAU,
Manila, P. I., December 6, 1904.

SIR: In answering your request for information as to the probable limits of successful tobacco production in these islands, I will say that at the present time the only good tobacco raised in the islands is confined to one river valley—the Cagayan, in northern Luzon.

From the weather records I see that there is no other spot in the islands having the same amount of rainfall and other climatic conditions so suitable for successful tobacco growing. It is a fact, furthermore, that good tobacco can not be grown anywhere in the world near salt water—probably within 10 miles of any seacoast or salt-water inlet. In fact, the different experienced growers and members of the trade here tell me that the distance from the seacoast necessary to grow good combustible tobacco is 20 to 30 miles.

If this be the case, certainly no very great things may be expected in the way of volume of produce from these islands under any conditions, as the tremendous amount of seashore surrounding the various islands of the archipelago would render the area of successful tobacco growing very small indeed.

The interior of every island is mountainous, and the rainfall so great that the successful raising and curing of tobacco would be absolutely impossible in all of these regions.

Most of the level lands and alluvial lands of the entire archipelago lie within 10 to 15 miles of seashore, and in these districts is found the bulk of the population. My own opinion is, from observing the slow way in which people here change their methods of doing business, that even if districts other than the Cagayan Valley—which now perhaps grows nearly all the tobacco it is capable of growing—should be found suitable for raising good tobacco, it would be fifty years before the industry would spread considerably to any other new sections.

For instance, the Pampanga Valley is devoted almost entirely to rice, sugar cane, and corn. I understand that it has been so since the recollection of the earliest inhabitants. The people in this valley, as elsewhere, are as conservative as the Chinese about changing their practices. Regardless of the possible profits in tobacco or other new crop, I do not believe fifty years would suffice to bring about any very considerable change in the crops they are producing.

Hoping these suggestions may be of some service to you, I am,

Very truly, yours,

W. C. WELBORN, *Chief of Bureau.*

MR. A. DETERMANN,
Care of Baer, Senior & Co.'s Successors, Manila.

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[From Senate Document No. 277, Fifty-ninth Congress, first session, hearings before the Committee on the Philippines of the United States Senate, p. 281-357. Reprint public hearings in Manila, P. I., August 9, 1905.]

MANILA, August 9, 1905.

STATEMENT OF MR. P. KRAFFT, OF THE FIRM OF BAER, SENIOR & CO.

(1) Cultivation of leaf tobacco.

I have drawn a map showing the actual regions under cultivation, the various colors representing the different grades of the quality. I also marked those regions which some time ago were under cultivation and which now are deserted on account of want of demand. A single glance at the map will give ample explanation that the fear in this direction has no reason to exist. It is an absolute fact, which can not be refuted, that all tobacco grown on the seashore or in the vicinity of it is of bad burning, be it grown here in the Philippine Islands, Sumatra, or in Java. I marked the bad quality, which is of no use, in blue. This is tobacco which burns black ashes only, and which is very inferior in quality.

The map which I have prepared is over there [pointing to a map which had been placed upon the rostrum].

(The map submitted by Mr. Krafft was one with the tobacco-growing sections shown in different colors to indicate where those sections were located and the quality of the leaf grown in each region. The different sections were colored in accordance with the following schedule:

Red: Section growing tobacco of good quality.

Yellow: Tobacco of satisfactory quality, a small proportion being fit for cigars.

Green: Tobacco of inferior quality and doubtful burning; not fit for cigars.

Blue: Tobacco of bad quality, bad burning; not fit for cigars.

Blue, inclosed by a circle: Tobacco of bad quality; very inferior; cultivation discontinued last year.

The regions colored in accordance with the above schedule are as follows:

Red: A strip along the Cagayan River in Isabela Province down to a little north of the Cagayan boundary.

Yellow: Along Cagayan River, from a little north of the Cagayan boundary line down to Amulung and along the Chico River to a little below Santo Niño—all in Cagayan Province.

Green: Along the Cagayan River, from Amulung to a little below Nasiping, Cagayan Province; also small sections in the interior of the Provinces of Ilocos Norte, La Union, Pangasinan, Nueva Ecija, and Cebu.

Blue: Small sections in the provinces of Abra, Ilocos Sur, and La Union along the seacoast, and along the west coast of Cebu.

Blue inclosed in a circle: Small sections in Batangas, Capiz, and Romblon.)

Representative COOPER. Mr. Chairman, will you permit me to suggest that the gentleman point out on the map and explain these different sections devoted to tobacco growing?

Mr. KRAFFT. Yes, sir; here is the map of the Island of Luzon, showing where lands are used for tobacco culture, the quality of the leaf being indicated by the coloring. You will notice that the only section where a good quality of leaf tobacco is grown is in Cagayan Valley, in this section here [pointing to the section colored in red]. Everywhere else the tobacco is of more or less inferior quality, while in Batangas it is so poor that the cultivation was abandoned last year.

Representative COOPER. About how many acres devoted to this inferior quality of tobacco is represented in Batangas, which you say was abandoned last year?

Mr. KRAFFT. A very few acres; in former times they produced from 5,000 to 8,000 quintals.

Senator LONG. Is the land shown on that map as colored the only land upon which tobacco is grown?

Mr. KRAFFT. Yes, sir; there are no other lands, except those I have marked. This shows that the area under cultivation in the islands is very small, as you will see.

Mr. KRAFFT again reads from his paper, as follows:

The area marked in green shows a somewhat better quality, but still remains unfit for making cigars, and only those regions which are marked in red and yellow represent a quality fit for cigar leaf.

Looking over the map, there is only the island of Luzon, and particularly the valley of the Cagayan River, which produces this tobacco. All other islands show a poor opportunity to raise good tobacco. As far as Mindanao is concerned, I am not able to give reliable information. I can only say that in former years tobacco was brought to Manila from there of an inferior quality. It therefore results that only the Cagayan Valley comes into the question. As the production there only averages 20,000,000 pounds a year, it must be said that in comparison to the cigar leaf produced in the United States, which amounted in 1904 to the respectable number of 140,000,000 pounds, it can not influence the price in the United States. There is still another fact which gives force to my foregoing assertion. The tobacco grown in the Cagayan Valley is sometimes of very different quality, according to the relations of dry and humid weather which exist during the growing. If the weather remains too dry during the months from December to April, without rainfall, the tobacco leaf turns out narrow, small, thick, and charged with gum and nicotine. Such tobacco is only fit for cutting purposes for our home cigarettes and for chewing tobacco, and can only be used for cigar making after the lapse of several years. It is, moreover, a fact that out of four crops only one is suitable for cigar leaf, and another fact is that too heavy rains produce a leaf which is neither good for cigars nor for cigarettes, as it is completely washed out and exceedingly liable to get worm-eaten and moldy. Moreover, it must be mentioned that tobacco can only be grown during the months of December to April on account of the succeeding inundations of the Cagayan River during the rainy season which cover the immediate banks of the river, leaving a rich deposit of vegetable manure. It can be proved that the tobacco grown in the upper fields, which are never subject to inundations, shows a poor quality. There are still other arguments to show that the cultivation of leaf tobacco in the Cagayan Valley has to meet with the consequences of typhoons and inundations setting in before the crop is harvested. It must also be stated that the greater portion of the land fit for cultivation is already under cultivation.

Mr. KRAFFT. Now, gentlemen, if you would like, I will show you some of the different classes of leaf tobacco grown in these islands; I have brought samples of the different qualities. This [holding up a bundle] is a poor quality.

Representative COOPER. How much a pound does that class of tobacco bring?

Mr. KRAFFT. About 9 centavos.

Senator LONG. To what countries is it exported?

Mr. KRAFFT. It is not exported; it is consumed in Manila. This grade is too poor for export to Europe or elsewhere; it is all consumed locally.

Senator LONG. What do you use it for?

Mr. KRAFFT. We mix it with other grades of better quality and make cigarettes out of it.

(The speaker here submitted to the inspection of the visitors a number of different grades of tobacco leaf, which were inspected by a number of the party.)

Mr. KRAFFT. This piece here [exhibiting a bundle] comes from the province of La Union, it is a poor quality; if you wish to see how it burns, I will light it.

The CHAIRMAN. Light a piece of it and let us see.

(The speaker ignites a leaf.)

Mr. KRAFFT. You will notice a very disagreeable odor.

The CHAIRMAN. It smells something like a Wheeling stogie.

Representative COOPER. What do you use that kind of tobacco for?

Mr. KRAFFT. On account of its having a poor leaf we send it to the countries having tobacco monopolies in Europe, such as Austria.

Representative COOPER. What does it sell for?

Mr. KRAFFT. About \$10 or \$8 per quintal.

Representative PAYNE. Have you any specimens of the best leaf produced in the islands?

Mr. KRAFFT. Yes, sir; I have some here [exhibiting a bundle]. This is Isabela leaf; it is the best we grow.

Representative PAYNE. What does this cost a pound to produce?

Mr. KRAFFT. We are selling it for \$60 to \$70 per quintal.

Representative PAYNE. What percentage of the crop is suitable for wrappers?

Mr. KRAFFT. Only a small percentage; sometimes when the crop is very

"fat" there is no wrapper at all. I think perhaps 5 per cent turns out in such a way that we can use it for wrappers—yes, 5 per cent. That would be a very satisfactory result.

Representative PAYNE. Is there any part of it suitable for binders?

Mr. KRAFFT. Yes, sir; for binders and fillers.

Representative PAYNE. You say only about 5 per cent is suitable for wrappers. Where do the binders or fillers go for consumption?

Mr. KRAFFT. Here in the islands; the greater portion is sold here.

Representative PAYNE. Some part of it goes abroad?

Mr. KRAFFT. In former times, yes; but not now. Now they do not want any of our tobacco except of the cheapest grades.

Representative PAYNE. To what countries was it exported before?

Mr. KRAFFT. We sent some to Holland, to Belgium, and other countries. If you will pardon me, I will continue reading my statement.

Mr. Krafft then read from his paper as follows:

(2) Production ad infinitum of Manila cigars.

As a consequence of the facts shown before, the manufacturers' supply of suitable leaf is limited. Therefore, the principal element being relatively scarce, the extension of cigar making is also limited. Moreover, it must be borne in mind that cigar making can not be learned from one day to the other. The cigar makers of Manila enter the factory as apprentice boys and are gradually taught the profession, beginning with stripping the leaf. It requires many years of daily occupation to have the fingers drilled in such a way as to be able to make a perfect cigar. In the recent Philippine census the number of cigar makers in the Philippine Islands is given as about 5,000. One cigar maker can turn out about 30,000 cigars yearly, taking as an average 600 per week, and taking the 5,000 men as now existing there would result about 150,000,000 cigars a year if all would or could make better-class cigars.

In order to do away with misunderstandings I should like to mention that there exists a divergence of opinion with experts in the United States and here in the Philippine Islands about the quality of cigar leaf, especially as far as wrapper is concerned. What is styled as wrapper in the United States is quite a different thing from what we used to call it here. Our cigar industry has not a necessary quantity of suitable leaf at its disposal on account of the thickness and bad color of the raw material, and often is compelled to fall back on leaf which in the United States would only be employed as bunches or fillers. The wrapper leaf which is exported hardly merits this denomination. Exports to Holland and Belgium, which countries in former years, before the appearance of the Sumatra tobacco, almost exclusively used Manila tobacco for this purpose, have now come to a standstill, and there is now only wrapper leaf exported to Spain and other countries having tobacco monopolies. Moreover, I wish to call attention to the fact that in the United States, as well as all over the world, the consumer has a marked tendency to smoke light-colored cigars, and it is a fact that light-colored wrappers are extremely scarce here in the Philippine Islands. It forms another proof that the fears entertained that Manila cigars with their dark color would probably constitute a serious menace to the home industry are groundless. Sumatra tobacco is imported in large quantities into the United States, which in 1901, as per Bulletin No. 28 of the United States Department of Agriculture, amounted to 6,250,000 pounds, valuing \$5,600,000, and being 95 per cent of all the wrapper tobacco imported into that country, the average price of 1 pound being about 90 cents. As \$1.85 per pound duty is paid and it requires 1 to 2 pounds of good wrapper to cover 1,000 cigars of average size, the outlay of a cigar manufacturer for this item is \$3.70 for duty and for raw material \$5.50.

For covering 1,000 cigars with Philippine wrappers a cigar maker would probably require 8.10 pounds at least. Taking 8 pounds, and considering the reduction of 25 per cent on duty, he would pay \$11.10 for duty and for raw material \$3.20, making a total of \$14.30.

In case of a reduction of 75 per cent we would still pay \$3.70 for duty and \$3.20 for raw material—altogether, \$6.90—so that the American manufacturer would prefer to buy Sumatra leaf, not only for reason of calculation, but on the basis of having a light wrapper of uniform color, while employing Philippine leaf he is at a great disadvantage.

The CHAIRMAN. With reference to the number of cigars made by a man in a week—what wages do you pay?

Mr. KRAFFT. We pay wages according to the size of the cigar made and the number a man can make; it depends upon the cigar maker's ability.

The CHAIRMAN. You pay the cigar makers by the piece, then. How much do they earn?

Mr. KRAFFT. Yes, sir; we pay them by the piece. A man will earn ₱8 or ₱10 a week or more; it all depends upon his ability.

Representative CURTIS. That is \$4 or \$5, gold, a week?

Mr. KRAFFT. Yes, sir.

Representative HILL. If you can buy Sumatra wrappers at \$5.50 and Philippine wrappers cost you so much, how is it that you don't use Sumatra wrappers? According to your data you figure that Philippine wrappers cost \$6.90 and Sumatra wrappers \$5.50. Why don't you save \$1.40 and use Sumatra wrappers?

Mr. KRAFFT. Well, there is a reason for that. We have tried to use Sumatra wrappers, but have not made a success of it. The Sumatra leaf is a much more delicate leaf than the Philippine tobacco, and our cigar makers are accustomed to using a strong leaf; and in handling the Sumatra wrapper, unless a man is very careful he destroys about 50 per cent of it or renders it unfit for use as a wrapper. One pound of Sumatra wrapper ought to cover 1,000 cigars, but I have made trials of it here and have had men ask me for 6 pounds to cover that amount, due to the fact that they spoiled so much of the leaf.

Representative HILL. How much Philippine wrapper do you use for 1,000 cigars?

Mr. KRAFFT. It depends upon the quality; the tobacco that we use for wrapper has so many rents and holes in it that sometimes it will take 8 or 10 pounds of it to cover 1,000 cigars.

Representative HILL. Take the ordinary Isabela leaf?

Mr. KRAFFT. Perhaps 4 pounds would be enough to cover 1,000 of the small-size cigars; sometimes at least 6 or 7 pounds are used. In this connection I would invite you to hear the testimony of Mr. Guido, who represents the Germinal Tobacco Company and is a manufacturer; he can give you more accurate information upon these points. However, I wish to say something more in connection with what I have read; there are some few additional points which should be mentioned. The methods used in growing tobacco upon the plantations owned by some farmers are very antiquated and exceedingly unbusinesslike; nevertheless they can not be improved by reason of the fact that the native sticks to his old methods and absolutely refuses to make use of better ones. Instead of having the work systematically done by performing wholesale the several processes of plowing, drying, and fermenting, and thus realizing not only a greater economy and larger output but also a better quality by the easier supervision thus possible—instead of this each family has its own piece of land, its own drying and fermenting sheds, and does its work from beginning to end in its own fashion, rendering the supervision of the expert employee a very difficult if not an impossible task. What can not be done in the estates is still more impossible with the independent native, who, left to himself, is incredibly careless and is producing a quality of leaf which is getting worse and worse from year to year and therefore less salable in the open market of the world. The per cent of tobacco grown on the estates is about 15 per cent of the whole output in the Cagayan Valley. This kind of wrapper [exhibiting a bundle of tobacco] would never have been produced under Spanish times. It would not have been permitted it is due to the carelessness of the planter—to carelessness in the fields.

Representative HILL. Do they use fertilizers?

Mr. KRAFFT. No, sir; the fields are not fertilized. Another point of importance is the transportation from the place of production to Aparri, the seaport of the Cagayan Valley. During the dry season the Cagayan River upon which the tobacco is transported to market, often gets so low as to paralyze navigation; while, on the other hand, during the rainy season the current becomes so swift as to make navigation extremely dangerous on account of the many hidden tree stumps in the river. So far as I know it is impossible to cover this risk by insurance. The freight charged is very high, so that we pay for transporting tobacco from Echague to Aparri ₱4.50 per bale of 24 quintals, or, say, ₱18 per ton, while the rate from here to New York direct, per steamer, is about \$6 gold in larger lots; in other words, it costs us more to bring freight from the tobacco fields in Isabela to Manila than it does to send freight from Manila to New York. However, the freight rates from Aparri to Manila have decreased somewhat during the last year, having gone down from 50 to 75 centavos per bale,

or ₱3 per measurement ton. The transportation on the river inland, however, is very costly.

Representative PAYNE. The railroads will remedy that.

Mr. KRAFFT. Perhaps after some years, but it will be a number of years before we have railroads. Another thing which is a great obstacle is the insects which get into the tobacco. In the first place there is a small worm which attacks the leaf, and, unless great care is taken to carefully brush off the leaves every morning, instead of an entire leaf we get one that is full of holes. Due to the carelessness of the natives in not properly caring for the tobacco, a great deal of the product is thus affected. In fact, I think that out of 200,000 quintals in the Cagayan Valley it would be impossible to get more than 10,000 or 15,000 quintals of entire leaves.

Representative PAYNE. I didn't hear all of your statement. Did you give the prices you make at the factories for manufacturing the different kinds of cigars?

Mr. KRAFFT. I can give those prices, but there is a technical man here who will be better qualified to do so.

Representative PAYNE. Well, if there is somebody else who will give the necessary information, that will answer my purpose.

Mr. KRAFFT. There is another worm which develops while the tobacco is in the drying shed and another kind while the tobacco is fermented; during the fermentation and while the tobacco is packed there is quite a different insect which attacks it—a kind of weevil, which develops inside the leaf. The extent of this weevil pest depends upon the quality of the crop; some crops are almost free from it, while other crops are always attacked by it, especially the crops which are washed out and are of poor color and weak; therefore, unless the greatest care is used, such grades of tobacco will arrive at the factories in Manila full of worms and insects. The new crop, of which this is a sample [exhibiting a bundle of tobacco], is one of these washed-out crops and is very poor tobacco. The 1900 crop was a very good crop; it was not worm-eaten.

Representative OTJEN. Suppose the tobacco is all right and you manufacture it into cigars; is there an insect that afterwards gets into the cigars unless you wrap them in tin foil?

Mr. KRAFFT. No, sir; the insect is in the leaf itself; it does not come from the outside; it develops inside the leaf. Here is the new crop of 1906 [exhibiting a bundle]; this is another specimen of a "fat" crop. Here is a sample of a washed-out crop [exhibiting another bundle]. We had in the beginning on that crop very dry weather, and then when the crop was about to be harvested heavy rains fell and washed it out; this tobacco will prove very bad; it will be useless either for cigars or cigarettes. This other will be ready for cigarettes in two years and for cigars in eight years.

Representative OTJEN. Regarding this insect you referred to, do you know whether tobacco raised in Kentucky, in the United States, is subject to the same kind of insect or not?

Mr. KRAFFT. I have heard of it, but I do not know the facts; I don't know whether they have the same thing there or not; it would be very interesting to know.

The CHAIRMAN. Does any gentleman desire to ask any further questions?

Representative HILL. What is the percentage of wrapper in Isabela tobacco, taking it as a whole—I mean good wrappers?

Mr. KRAFFT. I would not say that there are over perhaps 1 per cent good wrappers.

Representative HILL. What is that—1 per cent?

Mr. KRAFFT. Yes, sir; that is all that can be called good wrapper; this that I have here is not good wrapper.

Representative HILL. How can you afford to pay 40 cents a pound for tobacco that has no good wrappers in it?

Mr. KRAFFT. We are making cigars out of it. However, compared with the Sumatra cigars or cigars made in the States, this product makes a very poor showing; the lack of wrappers is a great trouble with us, and the Sumatra leaf is not used here, as I have already stated. The operators here can not handle it. Then, too, during the dry season it can not be used for the reason that it dries out and is very fragile; it is very expensive to endeavor to work it here. Another reason is that if you use the Sumatra wrapper in making cigars here, and the cigars are packed in a box during the dry climate we have in the dry season here, the wrapper gets torn or cracked open.

Representative COOPER. Can you tell about how many cigars are used in the islands in a year?

Mr. KRAFFT. I think it is about 50,000,000.

Representative COOPER. Your maximum output would be about 150,000,000; that would leave 100,000,000 for export. To what countries do you export cigars?

Mr. KRAFFT. Our exports have greatly decreased, but we are still exporting to the East—to China, Japan, India, the Netherlands, and to Australia—but these exports have decreased greatly on account of the competition we have received from the German manufacturers. The German manufacturers use Sumatra leaf, with German tobacco for a filler, which is neither bad nor good. He wraps up a very nice-looking cigar and sells it much cheaper than we can. The people in China want light-colored wrappers; this is true elsewhere also. These German manufacturers give them a light-colored wrapper; furthermore, it must be considered that the German manufacturers have no duty to pay. They import their Sumatra wrapper in bond and then ship their goods out when manufactured; they pay no duty upon this cigar leaf; that is a great advantage which we can not have here.

Representative PAYNE. What do these cigars sell for?

Mr. KRAFFT. They put this German cigar on the market there at 28 shillings per 1,000 for the Londres cigar, while we have to charge 44 to 50 shillings, and on top of that can not furnish them with light enough wrappers; they want a light-colored wrapper, so you see we are at a great disadvantage.

Representative HILL. What is the Londres cigar wrapped with?

Mr. KRAFFT. With Isabela and Cagayan leaf.

The CHAIRMAN. We will now hear the next gentleman.

Señor Justo Guido then presented a paper which was read by the interpreter, as follows:

STATEMENT PRESENTED BY JUSTO GUIDO, REPRESENTING THE GERMINAL CIGAR AND CIGARETTE FACTORY.

To the honorable the Secretary of War, the Representatives of the American people, the Governor-General, and the members of the Philippine Commission: The principal districts producing good tobacco in the Philippines are Isabela and Cagayan, in the island of Luzon. Of the tobacco from these districts of the crop of 1900, which was of the best quality, one of the lots purchased by the Germinal factory consisted of 7,932.75 quintals (806,000 pounds avoirdupois, in round numbers) of different classes, from first to fifth, costing ₱179,938.56. It was necessary properly to work up this article, on account of its good quality, and for this reason it was only used in July, 1905. From the date of the purchase to the date of manufacture the purchase value increased at this rate: Seven per cent interest for four years and nine months it was kept in the warehouse at the rate of ₱0.30 per quintal per year and fire insurance at the rate of 1 per cent per year. We must take into account that these 7,932.75 quintals of tobacco, after reassessment and classification, gave the following results: For wrappers, 584 quintals and 94 pounds (59,304 English pounds); for fillers, 3,453.83 quintals (350,727 English pounds), for cut tobacco (picadura), 2,821.29 quintals (286,489 English pounds); sweepings or waste having no application in any of the branches of the manufactures of the factory; 185.03 quintals (18,801 English pounds) of sweepings or waste resulting from the operations required in the manufacture of tobacco; 48.85 quintals (4,923 English pounds) of dust having no application whatsoever; 338 quintals of shrinkage or loss in weight noted when the tobacco was reweighed prior to its manufacture. As is logical, the decline in the value of tobacco, both for fillers and picadura, and the total loss resulting from waste and sweepings as well as from dust and shrinkage, affects the total suitable for wrappers and increases their price.

Moreover, the 584.94 quintals selected for wrappers are subjected to a further selection for the brands of cigars known as Perfectos, Londres, and other common brands classified as first, second, and third classes. Of the amount mentioned of wrapper tobacco the results of classification gave 10 per cent for wrappers of first-class brands, 20 per cent for wrappers for brands of the second class, and 70 per cent for wrappers of brands of the third class. The same thing happens with regard to the leaf used for fillers, which has also to be classified in three distinct groups or classes, according to quality, in order to apply them to the different brands, the selection resulting in that 15 per cent were suitable for the first class, 25 per cent for the second, and 60 for the third;

consequently the value of tobacco for wrappers for Perfectos increases to ₱182.50 a quintal (100 English pounds), ₱121.70 for brands of the second class, and ₱60.84 for ordinary brands; and for fillers of the three classes mentioned the resulting values are ₱80.87 for the first class, ₱53.91 for the second, and ₱26.95 for the third.

Finally, it must be taken into account that for each 100 pounds of leaf tobacco that can be used for cigar wrappers for Perfectos it is necessary to make a reduction of 25 per cent for stems and 10 per cent for waste in manufacture; so that the 100 pounds are reduced to 65, which is the net weight of the leaf that can be used. In the same manner, though in different proportion, the same allowances must be made for leaf for fillers, 25 per cent having to be deducted for stems and waste.

To give a concrete example, I will take as a basis 1,000 Perfectos in the manufacture of which enter 20 pounds of leaf tobacco for fillers and 7.69 pounds for wrappers, including allowance for stems and waste, for although it is true that the waste resulting from manufacture from the leaf used for wrappers as well as fillers is partly utilized for picadura (cut tobacco), its value is insignificant and scarcely affects the price of wrappers and fillers. If we add to the value of the tobacco that of other necessary materials, such as boxes, paper, rings, tin foil for wrapping, paper for interior lining of boxes, interior and exterior labels, and general expenses of manufacture, the value per 1,000 cigars amounts to ₱58.92, as appears in the appended table.

These 1,000 Perfectos, contained in 40 boxes of 25 cigars each, are sold by the factory at ₱60.

Now, then, if to the cost price we add the amount for duties under the Dingley tariff, freight and other minor expenses of packing, cartage to ship, unloading and hauling to warehouse, etc., the value of these cigars will perhaps be greater than similar Cuban brands, and in this case, on account of their inferior quality, they would not find favor in the markets of the United States of America.

TABLE No. 1.—*Leaf tobacco of the crop of 1900.*
REASSESSED FOR CLASSIFICATION AND PREPARATION.

Classification.	Isabela.	Cagayan.	Total.	Average price.	Value.
	<i>Quintals.</i>	<i>Quintals.</i>	<i>Quintals.</i>		
Wrappers.....	400.33	184.61	584.94	₱60.86	₱35,597.21
Fillers.....	2,300.31	1,153.52	3,453.83	29.32	101,283.34
Picadura.....	1,820.27	1,001.02	2,821.29	14.00	39,498.06
Waste.....	300.76	200.05	500.81	6.00	3,004.86
Sweepings.....	102.46	82.57	185.03	3.00	555.09
Dust.....	23.06	20.77	43.85		
Shrinkage.....	228.00	110.00	338.00		
Total and average.....	5,180.21	2,752.54	7,932.75	22.68	179,938.56

INCREASE OF VALUE FROM NOVEMBER, 1900, TO JULY, 1906.

Classification.	Interest. 7 per cent per year for 4½ years.	Insurance. 1 per cent per year for 5 years.	Storage. ₱0.30 per quintal per year for 4½ years.	Total value in July, 1906.	Price per quintal.
Wrappers.....	₱11,629.61	₱1,779.86	₱518.92	₱49,825.80	₱85.15
Fillers.....	33,069.27	5,094.12	4,835.36	144,302.09	41.78
Picadura.....	12,904.02	1,974.90	3,949.81	58,326.79	20.67
Waste.....				3,004.86	6.00
Sweepings.....				555.09	3.00
Total.....	57,622.90	8,848.88	9,004.09	256,014.43	

Selection made of the above leaf tobacco for separation into three classes corresponding to similar groups of select cigars.

FOR WRAPPERS.

Selection in classes.	Proportion of selection.	Quintals selected.	Proportion of price.	Price per class.	Value per class.
	<i>Per cent.</i>				
First.....	10	58.49	6	₱182.50	₱10,674.42
Second.....	20	116.99	4	121.70	14,237.67
Third.....	70	409.46	2	60.81	24,913.51
Total.....	100	584.94			49,825.60

FOR FILLERS.

	<i>Per cent.</i>				
First.....	15	518.07	6	₱80.87	₱41,896.27
Second.....	25	868.46	4	53.91	46,557.99
Third.....	60	2,072.30	2	26.95	55,848.83
Total.....	100	3,458.83			144,302.09

Table of cost of production of 1,000 Perfecto cigars having an approximate weight of 20 pounds per 1,000.

Item.	Quantity.		Cost.
	Per cent.	Pounds.	
Leaf tobacco:			
For wrappers—			
Available.....	65	5.00	
Waste.....	10	0.77	
Stems.....	25	1.92	
Total.....	100	7.69	
Cost of 7.69 pounds, at ₱182.50 per quintal.....			₱14.03
Less 0.77 pound wastage available for picadura, at ₱20.67 per quintal.....			.16
Total cost of wrappers.....			13.87
For fillers—			
Available.....	75	15	
Stems and waste.....	25	5	
Total amount of fillers.....	100	20	
Cost of 20 pounds, at ₱80.87 per quintal.....			16.17
Total cost of leaf tobacco.....			30.04
Materials:			
Boxes for 25 cigars, 40, at ₱10 per 100.....			4.00
Rings, ₱1.05 per 1,000.....			1.05
Tin foil, 1 kilogram.....			2.50
Paper used as interior lining of boxes.....			.35
Labels outside and inside for 40 boxes, at ₱45 per 1,000 sets.....			1.80
Total for materials.....			9.70
Manufacture:			
Selectors of leaf tobacco.....			.30
Stemmers, 25 pounds leaf tobacco for wrappers and fillers.....			.26
Selection of leaf for wrappers.....			.30
Making, per 1,000.....			13.20
Putting on rings.....			.15
Wrapping in tin foil, per 1,000.....			2.50
Packers, per 1,000.....			.37
Sealing.....			.10
Total for manufacture.....			17.18
General expenses.....			2.00
Cost of total production for 1,000 Perfecto cigars.....			58.92

[Same Hearing, page 355.]

STATEMENT OF A. LACSON.

ILOILO, August 15, 1905.

The "Manuel" estate, in the municipality of Talisay, Occidental Negros, P. I., the property of the undersigned, contains 200 hectares of second-class land suitable for sugar cane and an 8-horsepower steam mill, with the necessary appurtenances, buildings, etc., as follows: One mill house, two bagasse sheds, one sugar warehouse, and one dwelling house, all built of lumber with galvanized-iron roofs, valued at ₱20,000, and 100 head of carabaos, valued at ₱15,000; total, ₱35,000.

Expenses.

To plowing 100 hectares, labor of 50 men from July to November, five months, at ₱10 per month each, including food-----	₱2,500.00
To planting 250 lacsas (2,500,000 points), 50 laborers-----	1,000.00
To wages of 50 laborers in the cultivation and care of the cane for a period of seven months, at ₱10 per month, including food-----	3,500.00
To cutting and cartage of cane, estimated at 5,000 piculs, at ₱0.40 per picul-----	2,000.00
To expenses of grinding, using bagasse as fuel for the mill, and boiling sirup, by contract, at ₱1 per picul-----	5,000.00
To 50,000 pieces cordwood for boiler, at ₱20 per hundred pieces at mill-----	1,000.00
To 13,000 empty sacks for packing, at ₱5.50 per hundred-----	715.00
To 30,000 pieces rattan for packing, at ₱6 per thousand-----	180.00
To 10 per cent loss in cattle valued at ₱15,000-----	1,500.00
To 10 per cent deterioration of entire plant, farming implements, etc., valued at ₱15,000-----	1,500.00
To interest on capital, ₱7,000, for one year, and ₱8,895 for six months, at 15 per cent-----	1,717.10
To interest on total value of estate, valued at ₱35,000 (land, buildings, and carabaos), at 10 per cent annually-----	3,500.00
Total-----	24,112.10

So that the cost of the 5,000 piculs of sugar would be ₱24,112.10; that is, ₱4.82 per picul.

NOTE.—This price does not include expense of transportation to the Iloilo market.

A. LACSON.

Senator SCOTT. Do you raise any tobacco here?

Secretary TAFT. A little in Iloilo province, but it is not of sufficient importance to talk about.

Señor LACSON. I wish to state that I consider it an absolute impossibility for me to place my sugar in Iloilo at the price of ₱5.20, which has been given here.

Secretary TAFT. What does it cost you?

Señor LACSON. Well, I can deliver my sugar to a commission merchant or sugar buyer in Iloilo at a cost of ₱5.20 per picul, but you must remember that there are expenses of wastage and repacking. Many packages brought over are broken and have to be repacked, and then there are other expenses that have to be met.

Secretary TAFT. Do you have any ratoon crops upon your estates?

Señor LACSON. Very few; in just a few places.

Secretary TAFT. Do you know of any sugar planter in Negros that gets a ratoon crop for the third, fourth, or fifth year?

Señor LACSON. I have gotten a ratoon crop the third year by the use of fertilizers and by careful cultivation, but it has never paid me, and I wish to state that those gentlemen who have worked with ratoon crops have none of them made any money out of them.

Secretary TAFT. How much less does the ratoon crop produce than a new crop?

Señor LACSON. I should say that, weather conditions aside—that is, if we had normal weather conditions—it would lose the first year 25 per cent in comparison with a new planting.

Secretary TAFT. Well, he did not answer my question. Does he know of any planter in the Island of Negros who gets a ratoon crop for the fourth or fifth year?

Señor LACSON. Yes; I have known, and do know, of some who have gotten four and five ratoon crops, and I have done it myself, but only on very rare occasions, and it has never paid. As a general rule, after they get the third ratoon crop they prefer to plow up the land again.

Secretary TAFT. Is it the practice through Negros to get a third ratoon crop?

Señor LACSON. When it is fresh, new land it is the general practice to get a ratoon crop.

Secretary TAFT. Well, if it is not fresh land; if it is the land ordinarily used, do they get a ratoon crop or not?

Señor LACSON. Well, on my lands—and this is also true of all planters whom I know—we do not get a ratoon crop except from virgin ground, and on all other land we make a new planting each year.

Senator PATTERSON. What was the highest and lowest price received by the planter for sugar in Iloilo during the period of ten years between 1886 and 1896?

Señor LACSON. I have not the figures with me, although I have them in my books at home. However, I remember that we used to get ₱3.50 to ₱4.50. You must remember, though, that this was gold, and was equivalent in purchasing power to ₱8 or ₱9 at the present time.

The CHAIRMAN. The hour of 12 o'clock has arrived, and the committee will have to adjourn. I would like to ask Secretary Taft when it will be most convenient to him to go on again.

[Same Hearing, page 461.]

STATEMENT OF HON. WILLIAM H. TAFT, SECRETARY OF WAR—RESUMED.

UNITED STATES SENATE,
COMMITTEE ON THE PHILIPPINES,
Washington, D. C., February 7, 1906.

What we are discussing here is the growth of tobacco and the growth of sugar. The experience with respect to tobacco all over the world—and it is confirmed by Mr. Frye, of Connecticut, who, I suppose, has had as much experience as anybody in the practical raising of tobacco, and also as much knowledge of tobacco all the world over—is that in every country the amount of tobacco land—that is, tobacco land that will raise good tobacco—is a very small percentage of the total area available for agriculture. Tobacco is a plant, first, which exhausts the soil; and, second, it is a plant which is most sensitive to the chemical character of the soil. So it is that in the United States but one twenty-eighth of 1 per cent of all the lands is devoted to tobacco; in the Philippines it is one-ninth of 1 per cent.

Now, it is altogether unfounded and incorrect to assume that the soil and the agriculture in the Philippines is in a state of infancy. The Spanish Government was there for three hundred years, and they for a long time maintained a monopoly in tobacco and sought the land, and using labor as they did, by what was slave enforcement, cultivated the land where it was supposed to be most productive. So with respect to sugar, although that is not so sensitive, the character of the yield depends very much upon the soil. They have been acquainted with the raising of sugar in the islands for a very long time, and they have confined their profitable raising of sugar to two provinces, those of Pampanga and Occidental Negros. There is a good deal of sugar raised in Panay. Sugar will grow, as corn will grow, in almost any soil, but the profitable raising of the crop is a very different matter. I ought to add that sugar requires an immense capital when cultivated upon modern ideas, the calculation being that for all the plant it requires about a million-dollar investment for the production of 15,000 tons.

It is not confined to sugar and tobacco, this choice of land in the Tropics. Take the matter of hemp, which is the monopoly of the Philippine Islands. That has to be cultivated under particular climatic conditions and in particular soil. I am glad to say that there is every prospect that the land available for hemp is probably more capable of increase than that of any other plant in the islands, unless it be rice, for the reason that in the hemp provinces where this

hemp is cultivated there are vast tracts of mountain lands upon which hemp grows best—in the island of Samar and the island of Leyte, in the southwestern portion of Luzon. Even in some of the western portions of the islands it has been found that hemp will grow. Hemp being a monopoly, and hemp being capable of cultivation with a very little expenditure of capital, is, of course, the industry into which the energy of the islands will naturally direct itself.

Now, coming down to the available area of tobacco in the tobacco provinces, the census shows that 90 per cent of the tobacco lands in Cagayan are owned by small farmers; that 75 per cent of them in Isabela are owned by small farmers, and that only 15 per cent are owned by large companies. This is a direct outgrowth of the history of the cultivation of that plant. The Spanish Government maintained a monopoly with respect to tobacco for one hundred years or more, and directed the employment of labor by slave methods throughout that territory until the people rose. Thus the Spaniards found such difficulty in maintaining their agriculture as a government monopoly that they gave it up. A transfer was made to the people who had been employed as laborers in the tobacco business of the small holdings, and they became the small farmers of Cagayan and Isabela.

Now, the business of the tobacco manufacturers and the tobacco seller in the Philippines is not that generally of raising tobacco, but it is buying tobacco; it is going into each of those small towns in Cagayan and Isabela and buying from a family the tobacco that it produces, and the necessary effect on that agriculture is to make the agriculture poorer and poorer, for the reason that the labor is that of the children, of the women, and of the men who will not take the pains necessary to make good tobacco. Tobacco in the Philippines is subjected to all sorts of attacks by insects, and it requires therefore for its proper maintenance the greatest attention, patience, and industry. And what is the result? It is not given to the plant, and so tobacco leaves come in with worm-holes, and all sorts of objections to its marketable value.

Now, how are you going to improve that? The average population in Cagayan and Isabela is 23 to the square mile. There is very little, if any, movement of population into those two provinces. Compare that with the opportunity for obtaining labor in Connecticut or Pennsylvania, or the opportunity in Porto Rico, where the average population is 230 to the square mile, and where are you going to get the additional labor, even if you could make it useful in those two provinces? Those are the two provinces that we have been trying to reach by railroads in the Philippines. We have offered to furnish the bonds by which the railroad is to be constructed—that is, to guarantee the bonds—and we get no bids. Why not? It is because the two provinces are so lacking in population (for population and passenger travel in the Orient is what makes the dividends for the railroads), even with this Government assistance, we can not get railroads into that region. It is the most backward region in the entire Christian part of the islands, except, possibly, that of the Negritos in the mountains and the Pulahanes of Samar.

Now, I do not claim to be an expert with regard to land, or anything else in the Philippine Islands, but it is possible that I ought to qualify myself with reference to some of my statements. Some of these are made simply on information, as I gather them by studying the subject, and some by actual experience. One of the most valuable experiences to me was the investigation which I had to make, by calling witnesses, and by making inquiries wherever I could make them, in purchasing 400,000 acres of land from the religious orders in the Philippines, and of this land there was an estate which had been voted or given to the Augustinian order sometime in 1880, I think it was, of 60,000 acres in the province of Isabela, and the question was what we would pay for that estate. I had no means of going there—I had been up in Isabela, and had been on the estates of the Tabacalera Company, which is the company having the largest capital in the islands. The estate is a 60,000-acre estate, a little farther up the Cagayan Valley. I did not have opportunity to visit it. I went to Mr. Weber, who was a German, and one of the heads of the Tabacalera Company.

By the way, I ought to say right there that the assumption that there is nobody in the islands who knows anything about agriculture, and that they require the introduction of American agriculturists to make a complete reformation, has very little foundation. The Tabacalera company is a very rich corporation. It deals in hemp, in sugar, and in tobacco, and it has at the head of it Frenchmen, for a large part of its capital is owned in France, and it has in the active management of it on the estate this German gentleman, Mr. Weber.

Mr. Weber knew this Augustinian estate. I had been with him on the Tabaclera estate. He pointed out that the only acreage that he could use on his estate for tobacco was that which was down on the river-bottom land where there is an overflow every year. With reference to this Augustinian estate, he said, "I know it; I know there is a portion of that that can be used for tobacco purposes." "Well," said I, "what will you give me for the estate? Suppose I were to buy it for the Government, what would you give?" "Well," he said, "I would buy on one condition, and on only one, and on that condition I will give you \$200,000 gold for it—for the 60,000 acres." "Well," I said, "what condition is that?" He said, "It is that the Commission"—he had that same vague idea with reference to the powers of the Commission that some people in the islands have—he said, "It is on condition that you will allow me to introduce as many Chinese laborers into that plantation as I can, and wish to." I said, "Why?" He said, "Because otherwise the estate is worth nothing." Now, in the sale, I offered \$150,000 gold for that estate, and I supposed it was a fair price. When it came to the negotiation between the three orders, for that which I offered was treated as a lump sum, the sum was divided up between the different orders with reference to their valuation of the estate, and they cut down our Augustinian brothers just about one-half from the price which I had stated I was willing to pay and which the Commission subsequently approved.

Now, I think that illustrates the character of the statements with reference to the possibilities of the land. There was a company with millions of capital behind it who had all the experience, knew the labor, and knew all the other conditions, and yet they utterly refused to take it at all unless it had this imposition, this exclusion removed with reference to the Chinese labor. That only reflects the same thing that you will find in the statement of the commissioner of internal revenue of the islands, which, with the permission of the committee, I would like to insert in my evidence, not at length, but sufficiently to show just what is true with reference to the cultivation of tobacco in those islands.

Now I come to sugar. Occidental Negros is a great province for the raising of sugar. There are in that province 2,000,000 acres; of that a large part, I should say one-third, is hopelessly dense forests that has never been investigated by man. I do not mean that the Negritos do not run through it, but it consists of dense forests and jungle, so that a man gets lost in it and is never found. Perhaps two-thirds of the whole is quite mountainous; much of this rocky waste. The part that is used for sugar is what Mr. Hathaway describes as a coastal plain. His dimensions are erroneous. The coastal plain that he describes is from one to ten to fifteen miles wide. Much of that has been under cultivation for years. They do find that in certain cases, just below the hills where the soil washes down from the mountain streams, so as to form a rich alluvial soil, they do find places where it is possible to raise what they call ratoon crops—that is, crops that are not planted each year, but which follow from plantings of the previous years. They have in such instances two, three, and four, and sometimes in exceptional cases as high as eight ratoon crops.

But that is altogether the exception in Negros, and the average production throughout the island in the first-class sugar lands is from a ton to a ton and a quarter an acre. This I am able to state because I investigated the question. We had some friars' sugar land to buy in Cebu and in Cavite and Bulacan. The average yield, you will find, of the first-class land, as stated by Señor Luzuriaga, for five years, is that there will be one bumper crop; that there will be two average crops, and two that are bad crops. That is, 80 piculs per hectare for one year, 60 piculs for two years, and 25 piculs for two years, and if you will calculate that you will find that it is just about a ton to an acre on the average in the five years—perhaps from a ton to a ton and a quarter.

Now, in Negros there are in farms 420,000 acres; there is cultivated 168,000 acres, and 82 per cent of this is in small farms. In Pampanga there are 550,000 acres. Of these, 250,000 acres are set off in farms, and 60 per cent, or 150,000 acres, are cultivated. Now, I ask you gentlemen to go into your own census. Take the States that you suppose to be best cultivated and compare the percentage of the cultivated land in those States with these percentages and see what the difference is between the two. I venture to say that you will find that the advantage is in favor of the percentage of cultivated lands in Negros and Pampanga. So that this theory of an indefinite expansion in sugar is all a theory; it is all in the air.

I quite concede that we all of us have had dreams, and when I was here, after I came back from the islands, after having heard, as Mr. Gove calls them,

my poetic fellow-citizens of the Philippines describing the beauties of the land upon which they live, I did say before some committee that if we were given all the advantages that could be given us we would raise as much sugar as they do in Cuba. But when I was here I was subjected, I think, to thirty-five days of examination by this committee, and I was carried over every subject that could possibly suggest itself to the inquiring mind of the Senatorial investigator, and was interrogated on a great many questions with reference to which I had no accurate knowledge. But now we have a census; now we have gone into this matter, and now I have made an investigation into the value of the lands in the Philippines and into the actual production, and these are the facts as I have learned them.

Now, to come back to general conditions as to labor, in the street railways of Manila they pay 80 centavos a day to the common laborer and give him a breakfast. The street laborer for the government gets 100 centavos a day; that is, 50 cents gold, in the agricultural labor. They point to Lagranja as a place where you can raise 10 rattoon crops a year, and it is just going to increase the supply by making 6 tons to the acre in the Philippines. My brother Hathaway is not without some Philippine imagination on that subject. Now, what is the fact? We have to pay to the laborers there 30 cents in gold a day, and what is the fact with reference to the cost of raising sugar there? It cost us last year just 3 cents a pound with all the 10 rattoon crops a year, and everything else, painted with the somewhat deep colors of my friend Hathaway's statement.

Mr. Wheeler, who is in Negros now, engaged in cutting forests in that island, has imported labor. He could not get his labor in Negros, so he had to import it from Iloilo, and he paid from 25 to 37½ cents gold, and has to transport the rice from Manila to his place for nothing. He does not give them rice for nothing, but he gives it to them at Manila prices, and he gives them other privileges with respect to housing, etc. He brought 200 laborers. If the demand for labor is to be increased, as I shall show you, it must increase in order to have any effect whatever on the American market, the increase in labor is going to be such, first, that it will double or treble the prices. Indeed, the limitation in reference to the number of laborers that you can get, considering their character and their disposition to labor, is absolutely prohibitory beyond a certain acreage.

Now, in the hemp fields the question is whether the labor in the Philippines is sensitive to the demands, is sensitive to those questions of its supply, and the necessity for calling on it. In the hemp fields a skilled hemp puller, on shares—because that is the way they have to pay them there—earns \$2 gold a day. I agree that that is an exceptionally first-class man, because the work is hard, but the average earning is a dollar gold a day. Hemp is the profitable industry. Hemp represents 65 per cent of the exportation of the islands, and therefore when the hemp increases its effect upon wages is felt immediately.

Now, I would like to read Mr. Knapp's statement with reference to the labor in the islands. Nobody can say that when Mr. Knapp visited those island he was prejudiced in favor of the rice of the Philippine Islands. He is an expert on rice; he has deep interest in the development of rice in the State of Texas and in the State of Louisiana. He takes up one of the statements in the American Economist—that has been devoting its attentions, I believe, although I have not had the pleasure of reading its columns, to an abuse of those of us who are striving to work out the Philippine problem—and in the course of it he takes up a statement of that paper on the question of rice, which is just of a piece with the character of articles that have been circulated all over this country, and which have been sent to Ohio, Connecticut, Pennsylvania, and elsewhere, and aroused good people, aroused conscientious people, aroused people who had an interest in the cultivation of tobacco and beet sugar to an alarm that is absolutely unjustified by the fact. They have been circularized to death, and I have no doubt that every Senator and Member of Congress has received from home these statements as to the horrible condition that is going to follow the passage of this bill.

In the American Economist of July 7, 1895, I find an article on the above subject, which is at least very surprising in many of its statements. The following paragraph is a sample:

"It is possible for rice to be raised in the Philippines with cheap labor at a figure which would enable the Philippine producers to ship their rice into this country, in case the duty is removed, and dispose of it at prices which would

be absolutely ruinous to the entire rice industry of the United States. In the Philippines labor can be secured at from 10 to 15 cents per day, while the American farmer must pay from \$1.25 to \$1.50 per day. The Philippines use the crude system which has been in vogue throughout the Orient for hundreds of years at practically no expense, whereas the American farmer must use up-to-date machinery—high-priced harvesters, binders, and thrashers—which increase the cost of production and the marketing of his rice to very close to the figure at which it is sold."

That is the quotation. Now Professor Knapp goes on:

In the first place, it is not true that labor in the Philippine rice fields under American rule can be obtained at 10 to 15 cents per day. Twenty to 25 cents would be nearer the general average, and with the stimulus given to general industry by freer trade relations with the United States, farm laborers would readily command from 35 to 50 cents per day. This increase of wages is based on what has occurred in Porto Rico and the Hawaiian Islands when freer trade relations were established with the United States.

All this alarm about the ruin cheap foreign labor may effect in this country rests upon the false assumption that a 20-cent laborer in the Philippines does just as much work in a day as a dollar and a half laborer in the United States. As a fact, the American at \$1.50 is cheaper than the Filipino at 20 cents. It may be safely affirmed that American labor is paid the lowest wage of any laborer in the world, based on the work accomplished per day.

Then he goes on to discuss other subjects. Now I am asked, after reading from Professor Knapp, how do I meet his proposition that this is going to hurt the rice industry. I meet it in this way, by admitting that his proposition is entirely sound. Not that rice is going to be raised in the Philippines in such a way that it can be imported into this country, because we need it there, but that with the low duty on rice in the Philippines, they might afford to go over to Saigon, and to other places in that neighborhood, and import rice and eat that themselves, and send their own rice over to this country.

Now, I agree with Professor Knapp, and that is all he asks, that they shall not be allowed by that mere substitution to introduce rice into this country at a price that it can be raised at in Saigon with the lower duty added, and therefore I am entirely willing to concede, so far as my consent is of importance, that there should be inserted in this bill a clause embracing the rice imported from other countries with exactly the same duties that are imposed in the Philippines.

The CHAIRMAN. In the United States, you mean?

Secretary TAFT. In the United States; with this condition added, and that I ask to be inserted merely to protect the inhabitants in the Philippines from possible famine. In tropical countries the danger is much greater than it is in a temperate zone—the danger of the failure from the irregularities of rains and other things—unseasonable occurrences that affect crops. It is quite possible that there might be a drought, or there might be some other temporary interference with the production of rice that would make it necessary for us to lower the gates and let in rice so that the people might be fed at reasonable prices, and not be subjected to a suffering because of the exorbitant price of rice.

The condition, therefore, which I would ask to have inserted is that this duty on rice shall be imposed in the Philippines, to be reduced by the Commission whenever an emergency with respect to food arises in the islands, and in that case, in order to prevent what Professor Knapp fears, that there should be imposed on rice coming from those islands into this country just the differential. In other words, we do not ask for the Philippine Islands anything but the same treatment that everyone else has behind the tariff wall. When I say behind the tariff wall I mean with reference to those things which it is important to the Philippines should come behind the tariff wall.

I do not mean that we are to extend the Dingley bill clear around the islands, because it is necessary neither for the benefit of the United States nor those islands that it should be done; but give us the benefit of the markets for the agricultural products of those islands and then give free trade to the United States so that it may sell anything that it makes in those islands, and then with reference to the other articles upon which a revenue tariff is imposed in the Philippines, and with respect to which the United States has no interest, let them come in at the present Philippine revenue tariff. But for the purposes of the market, for the purposes of protection, put us just under the same ban and under

the same burden as the United States producer is. That is all we ask, and give us this market. The same principle applies as to the coastwise shipping laws.

Now I come to the specific question with reference to the market for sugar, and the question is, Will this hurt the beet-sugar industry—this bill? Speaking in round numbers, for the last year, which is the last one of which we have statistics—that is, the year 1904-5, and using only round figures, the United States demand for sugar was 2,700,000 tons. The local supply, in round figures, was 1,100,000 tons, a deficit of 1,600,000 tons which was supplied by, in round figures, 1,100,000 tons from Cuba, 350,000 tons from the East Indies, 50,000 tons from the Philippines—not so much; it was about 40,000, but I put it in round numbers—and other countries about 100,000 tons.

Now, I put it as a plain economic proposition, that everybody must recognize, that the question whether the beet-sugar people are to be injured or not depends upon the price of sugar in the market in which they sell their sugar. That is the first proposition. The second proposition is that the price which will determine what that sugar sells at in that market is the price at which the most expensive sugar is brought into the market and can be sold for in the market. Now, what is the most expensive sugar? It is that which comes from the East Indies and that which comes from Cuba. That which comes from the East Indies come over the tariff wall at the entire Dingley rate. That which comes from Cuba comes over the tariff wall at 20 per cent less, and that which comes from the Philippines at 25 per cent less than the Dingley rate, and these 100,000 tons that come from other countries come over the tariff wall at the full Dingley rate.

The second proposition is, therefore, that until the production behind that tariff wall increases 1,500,000 tons the importations from the Philippine Islands can not have the slightest effect—not the slightest effect on the prices behind the tariff wall. It might have some effect in reducing incidentally and indirectly, but most slightly, the world's price of sugar, by reducing the importation from the East Indies and Cuba into the United States and causing that to seek another market. But when the world's supply is considered it will be seen that its enormous total would, as compared with any possible production and export from the Philippine Islands, make its effect negligible. It therefore follows that the burden is on these gentlemen to prove that this is going to affect them in the slightest, to show that the increase in the product of the Philippine Islands and of American beet sugar will make 1,500,000 tons. Now, is that possible?

Considering the production that we have had in the Philippine Islands in past years, even when sugar was 4, 5, 6, and 7 cents a pound, it is utterly impossible now, with sugar at its present price, under the conditions of labor which I have described. Then consider the reluctance of capitalists to invest in those islands, which Mr. Hathaway's refusal to invest there illustrates and confirms. It is a mere dream to believe that ever in the Philippine Islands we shall go beyond four or five hundred thousand tons, and that in the course of a great many years.

Now what is the cost of producing sugar in the Philippine Islands? The only relevancy, and I beg the gentlemen to understand and see it clearly, the only relevancy with reference to the cost of producing sugar in the Philippine Islands and the profits on producing it is as to whether that will furnish motive sufficient to increase the production from the exportation of 83,000 tons to an exportation of 1,500,000 tons. That is the only relevancy that it has in this discussion, because no matter what it is produced for, if it added to increase in beet sugar in this country, does not exceed a million five hundred thousand tons it won't have any effect here, no matter what profit the Philippine sugar planter makes.

Now, then, what is the price per ton? I say that, according to the great weight of the evidence before your honorable committee, it costs under the present condition 4 pesos a picul, and that reduced to pounds is about \$1.50 a hundred, or a cent and a half a pound. Señor Luzuriaga is probably the best witness on that subject. He owns two plantations in Occidental Negros, and has lived there all his life. He has loaned money on sugar lands. He is a man of affairs, and I subjected him to a cross-examination at a time when this question was not ripe, just after we went back to the Philippines in 1902. I did it for the purpose of finding out the value of the sugar lands of the friars. He said that sugar land of the first class was worth from \$20 to \$30 an acre in Occidental Negros. His figure that the cost of sugar to the farmer was 4 pesos a picul laid down in Iloilo does not take into consideration the profit

of the farmer or the rental value of his land. It does not take into consideration the interest he has to pay on the loan, which is enormous, but it is only the cost with reference to the matter of labor—to the actual money consumed in the production of sugar. Mr. Welborn says the same thing. Mr. De la Rama says the same thing.

Now, on the other hand, we have the statement of Mr. Hathaway, who says it costs the Filipino farmer only 75 cents a hundred to lay sugar down in Iloilo. He says it will cost 24 cents to carry it to New York, so that means that without duty it can be laid down in New York at just about a cent a pound. If sugar can now be produced at a cent a pound, there is certainly no reason why in the past it should not have been produced at even less, for the coming into the islands of the Americans has certainly increased the wage, and everybody admits it.

Let us take Mr. Hathaway's assumption that you can produce sugar and lay it down in New York at a cent a pound. If so, the sugar planters and producers in the Philippine Islands, by shipping sugar to New York, in 1898 could have made a profit of 44 per cent at prices then prevailing. In 1899 they could have made a profit of 52 per cent; in 1900 they could have made a profit of 54 per cent, and in 1901 they could have made a profit of 36 per cent, and this profit would have been with the full Dingley rates imposed.

From 1902 to 1905 they would have made, at the prices then prevailing in New York, a profit of 41 per cent, and in 1903 a profit of 59 per cent, and in 1904 a profit of 64 per cent.

The profits above stated, on the theory that sugar can be laid down in Iloilo at 75 cents a hundred and carried to New York and laid down in New York, freight, commission, and insurance paid, for 24 cents, or in all, 99 cents a hundred, as stated by Mr. Hathaway, is shown by the following calculation:

	Per hundred.
Cost of laying down sugar in Iloilo.....	\$0.75
Commission, insurance, and freight to New York.....	.24
Duty on sugar polarizing at 84°.....	1.25
Total.....	2.24

The price of sugar obtaining in the New York market for the year 1898 for sugar polarizing at 96° was \$4.23 a hundred. The sugar polarizing at 84° is worth just \$1 less a hundred, so that the price of 84° sugar in 1898 was \$3.23. In 1899 it was \$3.41; in 1900 it was \$3.56; in 1901 it was \$3.04, and in 1902 it was \$2.54.

In 1902 the tariff was reduced by 25 per cent. If Mr. Hathaway's figures are correct as to the cost of sugar in the Philippines, the cost of laying it down in New York since 1902 would have been as follows:

	Per hundred.
The cost of laying down in Iloilo.....	\$0.75
Freight, insurance, and commission to New York.....	.24
Duty on 84° sugar.....	.94
Total.....	1.93

The price of 84° sugar in New York in 1903 was \$2.72 a hundred; in 1904 it was \$2.97 a hundred, and in 1905 it was \$3.28 a hundred, with the profits which I have above stated.

Now, let us take the importations of sugar from the Philippines and see the effect of such large profit on their amount. In 1898 they sent over 28,000 tons; in 1899, 21,000 tons; in 1900, 2,000 tons; in 1901, 5,000 tons; in 1902, when they might have made a profit of 41 per cent, they sent 5,000 tons; in 1903, 29,000 tons; in 1904, 25,000 tons, and in 1905, 43,000 tons, and that is what Smith, Bell & Co. have made such a tremendous loss on, yet we are told that we can make sugar in the Philippines and lay it down in New York at 1 cent a pound. Do not these comparatively small importations show the utter lack of foundation for the claim that sugar can be laid down in Iloilo for 75 cents a hundred and in New York for a dollar?

Why, the price in Iloilo is a cent and thirty-nine one-hundredths a pound, or was very recently, and it has generally been higher than that. According to Hathaway's figures this would give a profit to the farmer of 64 cents a hundred, or a profit of 85 per cent. This, of course, ought to make the sugar-growing industry on the islands most profitable. But is it so? Gentlemen, "The

proof of the pudding is in the eating." Call any witness and ask him whether that industry is in anything but a most disastrous condition.

Governor-General Wright was here and told you that the bankers have declined to loan any money on sugar estates, so bad is their condition. It is said that Mr. Yulo was making \$200,000 a year on his estate. We examined Mr. Yulo. His statement as to the profitable character of his business was very different. Why is it that Mr. Lacson, one of the planters in the Philippine Islands—upon whose estate I have been, and a very fair estate it is, beautiful to see—why is it that he has gone so much out of sugar and into rice? It is because at the price prevailing at Iloilo, from \$1.25 to \$1.39 and \$1.50 they can not raise sugar and live. So I say that Mr. Hathaway's investigation, kept in a diary, in which he had conversations with all sorts of people, constabulary officers and everybody else, and in which he gave the impression that he was there for the purpose of buying land, are utterly unreliable.

Now, Mr. Gove, with whom I became acquainted in the Philippines, when he told me he was out there in the beet-sugar interests to make investigations, and had been around with Mr. Hathaway, says that the Filipino people are poetic as witnesses. I agree that they are, and I agree that their imagination runs very rapidly when they are on the side of the bargain that assists in securing them a good price, and that therefore you are to weigh their evidence given in this case by making proper allowance for their interest in having this bill passed, and on the other hand, when you weigh what Mr. Hathaway reports as having heard from them when he represented that he was there to buy their land, you must make allowances for their desire to get a good price for the land.

Mr. Gove had a benevolent interest in the schools. He was also there to assist Mr. Hathaway. Well, it seemed to me last summer when in Manila that when we were on the ground we ought to examine all the witnesses possible who could throw any light on the subject and assist the visiting Senators and Congressmen. I suggested that Mr. Gove, who was present at the Manila hearings, listening to the evidence, should come forward and testify so that we might find out what his conclusions were and call other witnesses to make the conclusions more satisfactory. But Mr. Gove said that he was not able then to testify. "The truth is," he said, "I have not reached any conclusion; I have not got my data together in such a way as will enable me to testify."

Now, he had been about three months in the island, and it seemed to me that if he had discovered anything valuable by that time he might have made up his mind as to something and to have stated the conclusions. But he did not do so, and now he comes before us to tell us what the price of labor is, or rather what the cost of making sugar is in the islands. I submit that he would have made his evidence very much more weighty if he had frankly gone on the stand there at that time and told us the results of his investigations, instead of waiting until his companion, Mr. Hathaway, and he should confer and finally reach a result.

Now with respect to Mr. Hathaway, he was ill when we were in the islands the first time, but if he had been exceedingly anxious to have us know what his conclusions were, and investigate them, he might have communicated with the committee, or waited until the committee returned to Manila, but by that time he had left. He says he did suggest that we call one witness, Mr. Rothrock. We did not know of Mr. Rothrock's importance until we reached Bacolod, and he was not there, though that was his home.

Now, from Mr. Rothrock I have an affidavit, taken since, which I desire to read. It is an affidavit certified to be a true copy by the chief clerk of the bureau of agriculture, and is signed "P. O. Rothrock." It was taken by a notary public, Ricardo Nolan. The affidavit is as follows:

PHILIPPINE ISLANDS, *Province of Negros Occidental*, ss:

"P. O. Rothrock, being first duly sworn, deposes and says that he is a natural-born citizen of the United States of America, and a practicing lawyer, with offices at Iloilo and Bacolod, P. I.; that some six months ago a gentleman by the name of Hathaway came to his office in Iloilo, stating that he had come to the Philippine Islands for the purpose of investigating the sugar industry with a view of establishing a sugar central if he should find conditions favorable, and that within a few days he and his traveling companion, a Mr. Gove, intended going to the island of Negros. That as affiant had sugar lands on said island it was agreed that affiant should accompany the said gentlemen on their said trip of investigation; that affiant did so accompany them from

Iloilo to Silay, Talisay, and to Bacolod, and at times acted as interpreter in their talks with farmers on said island of Negros, neither of the said gentlemen being versed in nor understanding the Spanish language. That the said Hathaway in said conversations with the said farmers about the sugar industry stated that he represented capital, and that if he could procure lands and other favorable conditions, that they would put in a central. That in such investigations the said Hathaway, after stating his object, would ask at what price he could purchase land and how much, at what cost cane could be raised, if he could buy land, what it cost them to raise cane, and if in their opinion if he did erect a sugar mill the owners of land could and would furnish him with cane to mill.

"That affiant believes that the said Hathaway purposely led all such persons to believe that if they could convince him that a profit could be made he would at once make large investments, and that in many instances the cost of production was understood to mean the cost of labor alone to the farmers in their answers to the said Hathaway. That affiant had planned to continue his trip with the said Hathaway to the south of Bacolod, but became convinced by the time Bacolod was reached that said Hathaway's only object in making his "investigation" was to elicit a statement of how cheaply sugar could be produced, as he eliminated all matters except actual cost of raising the cane and a few questions at times as to grinding, and of how many ratoon crops could be raised under most favorable conditions. Upon being convinced that his only object was to get these statements and not to make any real investigation of the subject, affiant excused himself from going further with the said Hathaway. That in making the said trip the said Hathaway was assisted in every possible way by everyone, as being an investor who in all probability would help to solve and better the sugar problems of the island; that he had letters to leading officials here and to several large farmers from members of the Civil Service Commission, asking that all aid and assistance be given him in his said "investigations." And further affiant sayeth not."

"P. O. ROTHROCK."

"Subscribed and sworn to before me this 19th day of November, A. D. 1905. Affiant exhibited to me his certificate of registration, No. 319646, issued in Iloilo, P. I., January 6, 1905.

"R. NOLAN, *Notary Public.*

"A true copy.

"SETH BOHMANSON,

Chief Clerk Bureau of Agriculture."

Now, I submit that under those circumstances the evidence which Mr. Hathaway obtained was subject to great variation and great exaggeration. I believe Mr. Hathaway said he did not say to everyone that he was looking about to buy land, but it is immaterial whether he said it to everyone or whether he gave the impression to only a few, because that was enough to have it understood at once that a great American capitalist was there. Among an ignorant people like that, knowledge of the mission of a stranger passes from one locality to another so quickly that it seems almost as if they had telegraphic communication.

[From Report of the Philippine Commission, 1905, vol. 3, p. 122.]

TOBACCO INDUSTRY.

The following table shows the tobacco exported from the port of Manila during the first six months of the year 1905, by grades, and gives the average price per pound of each of the grades:

TOBACCO EXPORTED FIRST SIX MONTHS 1905.

	Duty per 100 kilos.	Pounds.	Value.	Duty.	Average price per pound.
Tobacco grown in the provinces of Cagayan, Isabela, and Nueva Vizcaya, Luzon.....	\$1.50	3,211,549	\$295,551.40	\$21,896.98	\$0.092
Tobacco grown in the Visayas and Mindanao Island.....	1.00	122,688	6,098.85	557.67	.049
Tobacco grown in other provinces.....	.75	1,545,200	69,936.47	5,267.95	.045
Total.....		4,879,437	371,584.72	27,722.60	.076

TOBACCO EXPORTED DURING JULY, 1905.

	Duty per 100 kilos.	Pounds.	Values.	Duty.	Average price per pound.
Tobacco grown in the provinces of Cagayan, Isabela, and Nueva Vizcaya, Luzon.....	\$1.50	1,229,349	\$101,616.25	\$6,331.95	\$0.082
Tobacco grown in the Visayas and Mindanao Island.....	1.00	236,603	11,760.00	1,075.74	.049
Tobacco grown in other provinces.....	.75	2,410,348	114,420.74	8,217.10	.047
Total.....		3,876,300	227,796.99	17,673.79	.058

NOTE.—Prior to January 1, 1905, no statistical record was kept of the relative quantities of the different grades of unmanufactured tobacco.

CIGARS AND CIGARETTES EXPORTED ON PERMITS.

In addition to the quantity of manufactured tobacco regularly exported, as shown by export entries and reported as exports, considerable quantities of cigars and cigarettes have been taken on board vessels destined for foreign ports upon permits upon which a fee of ₱0.50 per thousand for cigarettes and ₱1 per thousand for cigars has been charged.

During the past five months a statistical record of cigars and cigarettes so sent has been kept, from which it is shown that during the said period 276,684 cigarettes and 787,872 cigars have been exported from this port of Manila in this way.

Assuming that for the previous seven months the quantity thus exported was approximately in same proportion, the quantity exported during the fiscal year would be 663,970 cigarettes and 1,890,893 cigars, the aggregate market value of which would be approximately \$20,128 United States currency.

The monthly average of cigars thus sent is about 150,000 and of cigarettes about 50,000.

In addition to the foregoing, a great many cigars and cigarettes are taken on board of outgoing vessels in small quantities for personal use of passengers, and also a great many are sent in small quantities by mail which do not appear on customs records.

Generally the cigars and cigarettes taken on board in this manner are of better grade and higher market value than the average of cigars and cigarettes regularly exported, as shown by export entries.

* * * * *

TOBACCO PRODUCTS.

Leaf tobacco.—No tax is imposed in the internal-revenue law on the manufacture of cigars, cigarettes, or smoking or chewing tobacco by the consumer for his own use. With the exception of the one-third of 1 per cent imposed in section 139 on the value of sales made by merchants, traffic in leaf tobacco is free in these islands. Wholesale dealers in leaf tobacco, however, are required by this office to keep a record of all sales made to manufacturers of cigars, cigarettes, and smoking or chewing tobacco. In the provinces of Cagayan and Isabela is produced the only tobacco fit for use in the manufacture of the better quality of cigars and cigarettes. In the provinces of La Union, Ilocos Norte and Sur, Batangas, in two or three of the Visayan group of islands and in Mindanao, tobacco leaf is produced to a limited extent, but it has the reputation of being of an inferior quality. Except for limited local consumption by the persons raising it or for the purposes of blending it with the better leaf there is no demand for the tobacco raised outside of the provinces of Cagayan and Isabela. The Spanish Government had a monopoly, which lasted one hundred years, in the manufacture of all leaf tobacco produced in these islands. The Government supervision over the planting, curing, and sorting of the leaf was absolute and the quality of the tobacco was improved and the quantity increased by such supervision. In 1882 the Government monopoly was abolished and the planting and manufacture of tobacco became free for all. Since then the quality of the leaf produced in Cagayan and Isabela has constantly deteriorated from season to season. No sufficient preparation of the soil, no care in the selection of the seed, of the method of planting, or of the growing leaf, crude methods in curing the leaf, and dishonest practices of middlemen in sorting it for sale have all contributed to discredit the former fair fame of Philippine tobacco, both abroad and at home. A constantly increasing number of smokers in these islands are discarding the domestic cigar and cigarette and are smoking cigars imported from Sumatra and elsewhere, imported Chinese smoking tobacco, and even cigarette and pipe tobacco from the United States. On May 18, 1905, some of the leading cigar and cigarette manufacturers of Manila entered into an agreement having for its object an increase in the production and improvement in the quality of the tobacco leaf in Cagayan and Isabela, as well as to secure, if possible, more uniformity in the sorting of the leaf by middlemen. Little effective work, however, has as yet been done along these lines. Meanwhile the quality of the leaf continues to deteriorate and the local manufacturers find it an increasingly difficult task to supply demands for domestic consumption. The largest wholesale and retail dealer in Manila of cigars and cigarettes, who is also the authorized distributor for all of the leading cigar and cigarette manufactories, has just issued a pamphlet to the trade entitled "The Cigar Question." From this pamphlet the following is quoted:

"The demand for Philippine cigars and cigarettes has during the past two years exceeded the output, causing long and vexatious delays in filling orders."

Several of the larger cigar and cigarette manufactories are now running at full capacity an extraordinary number of hours each day, and when good leaf is not available they use the best they can get, which is, in many cases, poor enough. Under the caption "Cigars," below, are given the figures on cigars manufactured and removed for domestic consumption, tax paid, and for export, exempt from tax, during the year ended July 31, 1905. What the Manila cigar manufacturers will do with the United States market, assuming that they get it, is now the puzzle. Even though immediate and effective measures were provided to increase the amount of good quality leaf such as would be required to make cigars suited to the American taste, it would be several years before such measures would produce results and properly seasoned leaf would be available.

In Appendixes L to T and in Tables 1, 2, and 4 of Appendix W to this report will be found further data regarding the present status of the production of leaf tobacco, of the methods employed in the manufacture of cigars, cigarettes, and smoking tobacco, itemized statement of tax collections, etc.

Manufactured tobacco, smoking and chewing.—Section 101 of Act No. 1189 imposes a tax of 48 centavos on each kilogram of smoking or chewing tobacco of all kinds manufactured in the Philippine Islands for domestic sale or consumption. During the eleven months ended June 30, 1905, taxes were collected on smoking and chewing tobacco amounting to ₱84,439.55; during July, 1905, ₱8,435.64; total for the year ₱92,875.19. This represents a total output consumed in the

Philippine Islands of 193,490 kilograms. In addition, there was manufactured and exported during the year from these islands smoking tobacco (chopped tobacco, called "picadura") as follows:

	Kilograms.
To Spain	7,949
To Straits Settlements	2,814
To England	2,320
To China	1,958
To Japan	3
Total	15,044

Exported manufactured tobacco is not subject to the internal-revenue tax imposed in section 101. Added to the tax-paid tobacco this gives a total annual output from the factories in these islands for domestic consumption and for export of 208,534 kilograms of smoking and chewing tobacco. Considerable quantities of leaf tobacco are cut in one manufactory to be taken to another for conversion into cigarettes. As the tax on this tobacco is subsequently collected on the cigarettes no account is taken in the figures given above of the tobacco so handled. Of the tax collected on manufactured tobacco 84 per cent is paid in Manila and 16 per cent in the provinces. There is no snuff manufactured in the Philippine Islands. The chewing tobacco is used by the lower class of natives; they chew it mixed with betel nut.

CIGARS.—Section 107 of Act No. 1189 imposes a tax ₱2 on each 1,000 cigars worth 20 pesos or less per thousand, ₱4 when worth over 20 and not over 50 pesos, and ₱6 when worth over 50 pesos. The tax is assessed on the manufacturer's wholesale price on cigars removed for domestic sale or consumption. During the eleven months ended June 30, 1905, taxes were collected on cigars amounting to ₱145,996.81; during July, 1905, ₱14,740.53; total for the year, ₱160,737.34. Of this total 90.5 per cent was paid in Manila and 9.5 per cent in the provinces. This represents an output of cigars consumed in the Philippine Islands, by classes, as follows: Worth ₱20 or less per M, 60,276,450; worth over ₱20 but not over ₱50 per M, 8,036,890; worth over ₱50 per M, 1,339,480; total, 69,652,820 cigars. In addition there were manufactured and exported during the year from these islands cigars, by classes, as follows:

Exportation of cigars, August 1, 1904, to July 31, 1905.

To—	Worth per M.			Total.
	₱20 or less.	Over ₱20, but less than ₱50.	Over ₱50.	
China.....	39,770,418	9,301,097	664,145	49,735,660
Straits Settlements.....	3,971,960	3,816,518	69,343	7,857,821
Australia.....	3,487,406	2,381,118	191,284	6,059,808
England.....	3,227,912	1,941,349	89,322	5,258,583
Spain.....	2,350,500	648,900	230,770	3,230,170
India.....	947,370	601,361	170,883	1,719,614
France.....	1,838,500	36,000	500	1,875,000
South America.....	631,007	115,474	5,656	752,137
Germany.....	349,410	351,631	45,966	747,007
Japan.....	194,857	362,307	27,663	584,727
Indo-China.....	72,039	423,054	7,817	502,910
Java.....	344,494	122,416	9,257	476,167
South Africa.....	182,337	207,316	65,738	455,391
Italy.....	51,080	221,624	1,016	273,720
United States.....	54,371	71,561	41,761	167,693
Hawaiian Islands.....	64,000	77,000	3,500	144,500
New Zealand.....	28,719	58,851	44,146	131,716
Canada.....	24,077	91,146	980	116,153
Switzerland.....	34,750	40,300	7,125	82,175
Holland.....	53,000	2,000		55,000
Egypt.....	8,200	33,000	1,850	43,050
Belgium.....	15,000	10,500		25,500
Scotland.....	7,000	5,700	7,000	19,700
Korea.....	7,799	6,408	2,069	16,296
Persia.....	5,000			5,000
Consumed on high seas.....	216,178	500,384	146,220	862,782
Total.....	57,937,334	21,486,815	1,833,961	81,258,130

China is the best customer, taking about 60 per cent of all of the cigars exported from these islands. But much the larger portion of the cigars exported to China are of the very inferior grades; they are really large cigarettes wrapped, paper and all, in a strip of leaf tobacco, and are classed as "cigars" through courtesy and for the lack of a better name.

The total output of cigars from all of the manufactories in these islands during the year ended July 31, 1905, was as follows: For domestic consumption, 69,652,820; for export, 81,258,130; total, 150,910,950. The normal annual consumption of cigars in the United States is 7,000,000,000. If it were possible to divert every cigar made in these islands to the United States the home producers in that country would still have to supply about 98 per cent of the cigars consumed there. Inasmuch as the bulk of the cigars produced in these islands could not be sold in the American market at any price, it is believed, even though the Philippine cigar was admitted customs duty free into the United States, that the cigar manufacturers in that country would, for a long time to come, retain considerably over 99 per cent of their present trade.

Cigarettes.—Section 107 of Act No. 1189 imposes a tax of 67 centavos on each 1,000 cigarettes weighing 2 kilograms or less per thousand, and a tax of ₱2 on each 1,000 cigarettes weighing more than 2 kilograms per thousand. During the eleven months ended June 30, 1905, taxes were collected on cigarettes amounting to ₱1,812,141.05; during July, 1905, ₱183,990.52; total for the year, ₱1,996,131.57. Of this total 96.2 per cent was paid in Manila and 3.8 per cent in the provinces. This represents an output of cigarettes consumed in the Philippine Islands, by classes, as follows: Weighing 2 kilograms or less per thousand, 2,956,956,090; weighing more than 2 kilograms per thousand, 7,485,500; total, 2,964,441,590 cigarettes. In addition there were manufactured and exported during the year from these islands cigarettes, by classes, as follows:

Exportation of cigarettes, August 1, 1904, to July 31, 1905.

To—	Weighing per M.		Total.
	2 kilograms or less.	More than 2 kilograms.	
China.....	8,525,855	398,800	8,924,655
Spain.....	1,229,325	2,000	1,231,325
France.....	1,040,000		1,040,000
Switzerland.....	721,190	100,240	821,430
England.....	697,050	144	697,194
Straits Settlements.....	648,690	18,300	666,990
India.....	497,120	14,700	511,820
Australia.....	250,280	13,248	263,528
America.....	185,316	6,600	191,916
Guam.....	156,700	3,000	159,700
Japan.....	107,720	6,096	113,816
Java.....	27,785		27,785
Canada.....	14,765		14,765
Consumed on high seas.....	234,941	10,400	245,341
Total.....	14,336,737	573,528	14,910,265

The total output of cigarettes from all of the manufactories in these islands during the year ended July 31, 1905, was as follows: For domestic consumption, 2,964,441,590; for export, 14,910,265; total, 2,979,351,855 cigarettes. The Manila and provincial markets were largely overstocked with cigarettes removed from the manufactories prior to August 1, 1904, to escape the tax which accrued on that date. As a result the cigarette market was quite dull during the last five months of 1904; but beginning with the month of January, 1905, and continuing up to the date of making this report the volume of cigarettes removed from the manufactories, taken as a whole, has attained normal dimensions. The tax rate imposed on cigarettes in these islands is but one-third of the rate imposed in Porto Rico and less than one-third of the rate imposed in the United States. As a revenue producer the tax on cigarettes leads all others. Cigarettes weighing more than 2 kilograms per thousand and paying at the ₱2 rate constitute but a very small percentage of the total cigarettes consumed. As the internal-revenue law now stands, cigarettes now subject to the 67-centavo rate per thousand will, on and after January 1, 1906, be subject to tax at the rate of ₱1 per thousand. Even at this increased rate the tax rate in these islands will only be one-half of what it is in Porto Rico and less than one-half of what it

is in the United States, and consumers in these islands will continue to get two or three times as many tax-paid cigarettes for their money as they can get in the United States or in Porto Rico. It is recommended that the existing provisions of act No. 1189 taxing cigarettes remain unaltered.

Distribution of cigar and cigarette manufactories.—The cigar and cigarette manufactories in the provinces are few in number and relatively of little importance. The Manila manufactories control almost in its entirety the provincial trade. The poorer classes roll their own cigars or buy or raise their own leaf tobacco, chop it, and roll all of the cigarettes they consume. They did this before the internal-revenue tax was imposed and thus saved an amount equal to the manufacturers' profit. They still continue to do this and save an additional amount equal to the tax on the manufactured tobacco, cigars, or cigarettes they consume. In Manila there are 58 manufactories where cigars are made and 50 manufactories where cigarettes are made. The cigars are made exclusively by hand; one of the larger manufacturers imported sometime since two cigar machines of European make for experimental purposes, but the tests were unsatisfactory and the machines were discarded. Most of the cigarettes are machine made, all but seven of the manufactories having their own machines. In some of the larger manufactories special brands of handmade cigarettes are turned out. The usual number of cigarettes to a box is 30, but a considerable number are put up in packages of 24 and even less. The girls in the manufactories are quite expert, and will unerringly and almost automatically lift from a pile of cigarettes the exact number needed to fill the boxes they are packing. Twenty-four Filipinos, 19 Chinamen, 14 Europeans, and 1 American negro are engaged in the manufacture of cigars, and 25 Chinamen, 14 Filipinos, and 11 Europeans are engaged in the manufacture of cigarettes.

[Same Report, page 203.]

APPENDIX L.

OUR AGRICULTURAL RESOURCES.

[Editorial from *La Voz del Pueblo*, of Tuguegarao, Cagayan, June 22, 1905, on the production of tobacco in that province.]

Under this title we include our only agricultural product with which our brothers in the field provide for their necessities. It is in the development of this product that their future lies. We call the attention of our agricultural brothers to the discredit in which tobacco leaf is held, in an increasing scale, in the Manila market.

Our object in taking up this question is only to illustrate to the thinking people of the province and the valley of the Cagayan the fundamental reasons that have caused the depreciation of tobacco leaf and the remedies necessary to cure the evil.

The existing prostration of the tobacco industry is primarily due to the laziness and bad faith of the agriculturist. Our extreme laziness, due to the enervating climate of these latitudes and encouraged by the fertility of our soil, has been exaggerated by the absence of official intervention and encouragement since the time when the tobacco monopoly by the Government was abandoned. The demand for tobacco increased, when its cultivation became free to all, until it reached its highest mark in the year 1900, when the agriculturists mortgaged their crops at fabulous prices and did not attempt to duly season the leaf nor properly prepare the soil; this resulted in the practice existing to this day among the large majority of our agriculturists—to raise large crops with a minimum of labor. It is evidently believed that a large quantity of leaf will make up for poor quality. The sophistry of this method of reasoning should be made apparent, and the endeavor should be made to produce smaller crops but of better quality.

Our bad faith has become noticeable in the mixing of different grades of tobacco in the same packages, all of which is due to our greed after lucre. We do not seem to understand that by this procedure we destroy the main fountain from which our agricultural wealth springs.

These, then, are the two prime causes of the present unsatisfactory condition of the tobacco culture, and we shall now proceed to enumerate the methods which, in our opinion, should be followed by the producer in order to avoid the menace now before us of the total annihilation of the main source of wealth of the valley of Cagayan.

If the human family requires in its raising the utmost care in order that it may be brought to a healthy maturity it is no less the fact that the nurseries for the production of the tobacco seedlings should receive the same careful attention. Soil of the proper richness should be selected, preferably virgin soil from which the forest growth has recently been removed, and if such soil is not available, then the soil used for the nurseries should be properly pulverized and fertilized. The matter of watering or irrigating these beds should also receive careful attention until the seed has generated. The transporting of the seedlings should be made at a time when the first two leaves have grown to about the size of a peso.

If in the conservation of animal life proper hygiene is necessary it is also necessary for the proper nutrition and development of vegetable life. For the care of the growing plants it is necessary that the ground should be properly prepared. The soil should be plowed three or four times in order to break up the clods and permit the roots of the tobacco plants to penetrate and absorb the necessary nutritive matter therefrom. The soil should be properly fertilized. The worms and other insects and the weeds that grow up in the plantation should all be eradicated. The plants should be watered or irrigated in such a manner as to not wet the leaves (this in case of drought). The buds should be picked off in order that the sap, which would otherwise go to waste, may be used to increase the size and quality of the leaves. All young shoots that do not promise to produce good leaves should be removed.

After all foresight has been used for the care of the growing plant careful attention should be devoted to the gathering of the leaves. This should be done at the proper stage of their development, neither when they are too green nor after they have passed the proper stage.

If the agriculturist takes pride in the appearance of a plantation properly cultivated he should also take the same pride in seeing that the harvest from his fields is properly cared for and seasoned before it is delivered to the purchaser. Tobacco leaf should be cured under roof, in order that the changes in the weather may not affect its quality. To-day tobacco leaf is largely seasoned in the open air and the rain and hot sun prevent the proper curing, which can only be obtained in an equable temperature. Care should be taken also in the cutting of leaves which go to make up a *manejo* (package); in the conscientious selection of the leaves of the various grades in order that they may be properly classified and delivered and, in this manner, to rein confidence on the part of the purchaser in our good faith; in the proper handling and pressing of the leaf in order that the delicate fiber may not be injured; in patient and intelligent stacking of the leaves in order that the curing may be uniform and perfect and that a uniform temperature may be obtained, otherwise the leaf will ferment and spoil. In the stacking of the tobacco leaves a vent should be left in the center of each stack in order that the vapors from the sweating of the leaves may have an opportunity to escape, and in order that the noxious gases may be eliminated and that the aroma and proper coloring of the leaf may be obtained. In the handling of the tobacco the various bundles and packages should be turned and distributed so that each may alternately occupy an exterior and an interior position in the stack.

With regard to the use of fertilizers of the soil it has been found in practice that the best result will be obtained by their use. We have seen that the valley lands, which are periodically watered by the Rio Grande, from which this province takes its name, produce a superior crop. It is therefore recommended that sufficient fertilizers be used on the higher lands devoted to the culture of tobacco and to which the alluvium from the river can not be carried even at the high stages of water.

The foregoing remedies which we have prescribed to bring about a better condition in our agricultural industry, now so depressed, are more in the nature of reminders, for the reason that the agriculturists of this valley are already well aware of their duties in the premises. We therefore remind our brothers in the fields that if, before the time when the Government monopoly on tobacco lands was removed, they worked because of the fear of the overseer's whip they should to-day work under the influence of the fear that if they do not do so there will be no purchasers for their product.

We conclude these few lines earnestly advising the agriculturists of this valley that they endeavor to apply the remedies we have printed and that by doing so they will, to the extent that in them lies, have assisted in raising our principal source of agricultural wealth from out of its present slough of despond.

APPENDIX M.

CAGAYAN AND ISABELA TOBACCO LANDS.

[By H. B. Fernald.]

I. TOBACCO LANDS.

The cultivable area is roughly shown by the attached map^a and will be seen to consist of a strip of about 5 to 10 miles in width along the Cagayan River and its tributaries. Tobacco can be grown as far north as Gattaran, but it is not of the best quality. The lands from Tuguegarao to Alcalá used to raise a first-grade tobacco, but they have been worked so continuously that the best tobacco is now found in the more recently developed lands.

There are two main factors which determine the availability of land. (1) The natural conditions, and (2) the means of transportation.

(1) *The natural conditions.*—During the rainy season, from September to December, the Cagayan River and its tributaries rise from 10 to 40 feet, covering the valleys for miles on either side with their muddy waters, which leave a deposit sometimes of several inches of silt. This makes the first-class tobacco land. Back of this is the second-class tobacco land, which is not inundated and which is practically uncultivated. These lands could in many cases, with but slight expenditure of capital, be easily flooded from some of the many small streams found throughout the country.

(2) *Means of transportation.*—For lack of fitting transportation facilities great sections of the finest tobacco lands are uncultivated, especially the Magat Valley and the upper Cagayan above Echagüe. From December to June only rarely can steamers of 3 feet draft go above Alcalá. From July to January they can usually reach Tuguegarao. From September to December they can usually reach Ilagan and sometimes Cauayan. There are two steamers, the *Magat* and *Magapic*, belonging to the Tabacalera Company, which handle only company's freight; one, the *Aparri*, belonging to a private company, which does a general business; the government steamer *Sentinel*, and three small launches. Practically all the tobacco transportation is therefore by cascoes. Probably three-fourths of the tobacco business is in the hands of the Tabacalera Company. They have their storehouses in every town. The tobacco stored in these is loaded in cascoes, which are poled, rowed, or sailed down the river until they can be taken in tow by one of the steamers and go to Lalloc for transshipment. Other cascoes go all the way to Aparri unaided. Two weeks for the trip from Aparri to Ilagan and a week for the return is quick time for a casco. The cascoes continually go aground on the numerous sand bars and often have to be unloaded before they can cross a bar. The cost of such transportation, added to the heavy rates charged by the coast steamers, make the expense of shipment equal to 25 per cent to 50 per cent of the value of the product shipped.

In addition to this expense of river shipment must be noted the cost of cartage from the fields to the river. There are practically no improved roads in the valley, and 10 miles is about the limit for profitable cartage. This is the reason that such large tracts on the upper Cagayan, on the Magat, and on many other smaller rivers are uncultivated. Many of these rivers are great torrents in the wet season, overflowing miles of fertile ground, but in the dry season are small streams, which do not serve even for rafting the tobacco to the main river.

The larger part of the land is owned by local owners in small parcels, but there are a number of large estates, especially in Isabela Province. These estates are worked by "colonistas," each of whom has his own parcel of land to work.

Few persons have valid titles to their land, and it is a common practice to settle on any suitable unclaimed land and cultivate it.

II. THE METHOD OF CULTIVATION.

In the latter part of November or early in December the tobacco is sown in seed beds, and as soon as the fields become dry enough to be worked the plants are transplanted to the fields, which have been plowed twice or thrice with the ordinary plow, harrowed with a bamboo harrow, and marked off in squares. The weeding is done twice by hand and the weeds left lying between the rows. A plow is sometimes run down between the rows. The suckers are

^a On file in the Bureau of Insular Affairs, War Department.

not picked off. The plants are budded once. Sometimes the leaves are picked one by one as they ripen, but oftener the whole stalk is cut at once. The leaves are stuck on sticks about a yard long and the diameter of a pencil, and put in the sun to dry. When dry, they are piled in the houses and changed occasionally as the bottom of the pile grows too hot. Before being sold the leaves are taken from the "palillos" and made into "manos" or flat packages. "Sweating" is usually done by the buyers before shipment to Manila, and again in Manila much more thoroughly.

III. IMPROVEMENTS NEEDED.

(1) *Transportation.*—The great need is for a railroad. The route suggested is shown on the accompanying map.^a Of necessity the railroad would have to go some distance from the river and would on this account pass through much land not now available. It would also so reduce freight rates that tobacco could be carted longer distances. It would further mean that large numbers of settlers from the overpopulated provinces around Manila would come into the valley and take land not now cultivated. Such a road would not probably pay expenses for the first few years, unless the timber trade should enable it to do so, but the general increase in production and prosperity which would rapidly come would make it a paying enterprise thereafter. In bringing the valley into closer touch with Manila markets and with the civilization of the outside world the railroad will do an invaluable work.

(2) *Cultivation and care of the tobacco.*—The value of the tobacco crop of Cagayán and Isabela is much less than it would be if more scientific and careful methods were followed in planting, cultivating, and curing the tobacco. Some of the principal defects are as follows:

(a) The seed has been unchanged for years and has greatly degenerated. The importation of fresh seed from Sumatra, Cuba, and America would be a material gain.

(b) The preparation of the soil is very imperfect and expensive. Modern implements would prepare the soil better at a smaller cost.

(c) The suckers are not removed, but are allowed to grow in order to get a greater number of leaves. The buds are only removed once, and then allowed to grow again without removal. In this way a large part of the strength of the plant goes to suckers and buds.

(d) Nothing has been attempted in the way of raising tobacco under screens.

(e) When picked the leaves are jabbed on sticks, which makes a considerable hole as compared with the method of using small strings, as in Sumatra.

(f) In drying, the leaves are exposed to the hot sun. They should be first dried in darkness and then the light gradually admitted. This is probably the greatest defect in their tobacco culture and permanently injures the tobacco produced. Instead of being dried out, the oils are burned in. No process of sweating can afterwards remedy this.

IV. TO IMPROVE THE SITUATION.

(1) *Tariff reduction.*—The benefits to accrue are self-evident. Not only would those now raising tobacco receive a better price for their tobacco, but new capital would enter the valley, with improved methods of cultivation and transportation resulting.

(2) *Railroad.*—If the Cooper bill becomes a law, there can be but little doubt that a railroad will be built passing through the timber lands of the Caraballo Sur and the tobacco lands of the Cagayán Valley. The road would soon become a paying investment and the benefit to the country would be immeasurable.

(3) *River improvement.*—If the river could be dredged or in some other way the sand bars obstructing the channel could be cleared, it would reduce the cost of river transportation by almost one-half.

(4) *Coolie labor.*—Were the introduction of coolie labor to be permitted it would mean the establishment of large, rich haciendas, a great increase in the quantity and an immense improvement in the quality of the tobacco produced, and a vast increase in the general wealth of the country, but the Filipino labor would not be able to keep the pace thus set and would be driven to the wall.

^a On file in the Bureau of Insular Affairs, War Department.

(5) *Education*.—The present school at Teguegarao is the beginning of a valuable work whose influence will gradually effect some improvement. There is an old Spanish Government farm at Ilagan which might be reestablished with profit and would prove a valuable object lesson in improved methods.

(6) *Fairs*.—As an immediate means of arousing an interest in improved methods of agriculture nothing would accomplish so much as the old-style "county fair." Improved agricultural implements would be brought directly to the attention of the people. The bureau of agriculture could have tobacco in various stages of cultivation, showing what approved methods will do. An object lesson of this kind would be of incalculable value. Abundant land could be obtained at Tuguegarao and thousands of people from all through the valley would attend. The usual prizes should be given for local products, and everything would be run along the line of the "county fair" in the States. One or two thousand pesos would cover the cost of the necessary buildings, and the good immediately resulting would be measured by tens and hundreds of thousands of pesos in the increased value of the crop raised.

APPENDIX N.

THE TOBACCO INDUSTRY IN THE PHILIPPINES.

[Article by Mr. B. Ayesa in *El Mercantil*, of Manila, April and May, 1905.]

The Hon. Mr. Taft, at a meeting of American tobacco growers, made the assertion that the only tobacco worthy of mention in the Philippines was that produced in the Cagayan Valley.

Mr. Taft knows perfectly well what he has said and this demonstrates once more the deep study that he has made of the Magallanic Archipelago.

Can the Cagayan Valley tobacco be compared with that produced in North America in the States of Kentucky, Virginia, and Maryland? We firmly believe so.

The Cagayan Valley, and above all the province of Isabela, can produce tobacco very much superior to that now raised (or said to be) in that region; but the deplorable state of backwardness in which the cultivation, the curing, and the handling are found, makes that leaf (which could, if presented in the different markets of the world, obtain one of the foremost places) discarded at the present time because of its poor quality and even worse presentation.

About a decade ago the Philippine tobacco entered and was valued in the markets of Amsterdam, Trieste, Antwerp, Hamburg, London, Spain, and others. To-day it may be said to have become limited to the Spanish market, and this latter will be likewise lost very soon, for at the termination of the period of ten years provided by the treaty of Paris, and when Spanish goods cease to be favored by the tariffs, it is almost certain that the Spanish monthly mail steamers will also cease to ply, and then it is very probable that the doors of Spain will be closed to Philippine tobacco.

Now that the Philippine tobacco question is so much debated, both in America and in the Philippines, and prompted by the best wishes for and in defense of this industry, I propose to undertake a complete essay thereof, for which I will draw upon my experience of twenty-two consecutive years engaged therein.

No industry can be developed with probable success without counting beforehand with good first materials.

To judge by the fame acquired at one time by Filipino tobacco when it became free of the monopoly exercised upon it by the Spanish Government, anyone would have believed that this industry would make great strides.

Logically considered this belief was very natural, for once the business was delivered up to private enterprise and the planters were at liberty to sell their tobacco to the highest bidder it was to be supposed that both the tobacco cultivation and its industry would improve greatly. But the Philippine Islands have been and will be a country of hidden problems, and tobacco continues since then in an alarming state of retrogression.

What are the causes? We will endeavor to expose them clearly in the following articles.

The history of Filipino tobacco dates from the year 1783, when Governor-General Basco decreed that the government should have control of tobacco. Therefore, tobacco in the Philippines was monopolized exactly one century.

The Government exercised entire monopoly both as to the leaf and the manufactured, for which purpose it had a corps of appraisers distributed over the different provinces and towns where the plant was cultivated. In Manila it had various factories for the manufacture of cigars, cigarettes, and smoking tobacco.

The chief appraiser, styled "interventor," resided in the capital of the province and had at his orders various subordinates called "alumnos aforadores."

These operated by districts composed of various towns, and in each town there was a "caudillo" (head man), who was at the same time "gobernadorcillo" (little governor), who, together with the "teniente" (overseer) of the tobacco fields, exercised the office of inspector of cultivation and was remunerated by a percentage of the crop.

The chief appraiser issued the order fixing the date upon which the first tobacco seed plot should be planted, for there were several, alternating generally every fifteen days.

These were common seed plots and occupied at least one-half a hectare of land each. Their care and weeding were in the hands of the old men, the women, and the children of their respective towns, while the able-bodied men engaged in plowing their lands and preparing them for transplanting the tobacco plant.

At first sight it would seem that the inspection exercised over the planter was somewhat oppressive, treating him as if he were a colonist or laborer not working his own property.

Nothing could be more erroneous. That wise inspection was purely paternal and, thanks to it, the tobacco seedlings were obtained in proper season. The lands were prepared with three plowings, at intervals of fifteen days each, and the transplanting was done, commencing with the highlands in the second half of November and ending with the lowlands in the first half of January, a period during which it is well known that the transplanting should be done. There is a common adage that says: "Mas vale llegar á tiempo que vender un año" (It is better to arrive in time than to round about for a year); and following this most true maxim, we may say: "He who sows in time has an almost certainty of reaping a good crop."

A person acquainted with the beautiful plantations of the Cagayan Valley knows likewise that they are favored with fine, ambient temperature, humidity, adequate seasonable winds, and the proper chemical composition of the soil to bring forth as a result those magnificent tobacco leaves, the beau ideal of the smoker.

But this leaf, which at one time acquired justified fame, is being lost at gigantic strides within the past few years.

The tobacco now cultivated in the Cagayan Valley may be said, without doubt, to be almost a wild plant.

Planters, both on a large and small scale, seem to have united for the purpose of casting ill repute upon the Filipino tobacco.

I know that this assertion will bring forth cries of protest; but I have undertaken to publish a complete study of tobacco in its different phases, and if I now touch the sore spot of the planters, to-morrow I may touch that of the leaf-tobacco dealers, and later that of the manufacturers, for they are all and each one of them in their sphere of action responsible for the deplorable state of Filipino tobacco.

We said in our preceding article that once the tobacco business was delivered into the hands of private enterprise, it was to be supposed that both the cultivation and the industry would improve greatly.

True it is that the manufacture of tobacco is all that could be desired as to its presentation and style. The Filipino cigar maker has no rival. But, on the other hand, that special preparation of the tobacco, those secrets of manufacture which have given so much renown and profit to certain manufacturers—this art is yet in its infancy here, and we can voice it loudly.

Upon the abolishment of the government monopoly of tobacco in the year 1883, a mercantile company was established in the Philippines under the name of "Compañía General de Tabacos de Filipinas."

This powerful company began to operate then with a cash capital of \$5,000,000.

It founded the great cigar and cigarette factory entitled "La Flor de la Isabela."

It secured the greater part of the leaf tobacco of the first crops, and thereby acquired almost in its entirety the monopoly in tobacco.

In Isabela, Luzon, it bought from the Government and private parties extensive tracts of lands, known to-day as the San Antonio, San Luis, and Santa Isabel plantations. These plantations were populated by immigrants from the provinces of Ilocos Sur, Ilocos Norte, La Union, and Abra, likewise tobacco-growing districts, though not on the scale of Isabela and Cagayan. We wish to say by this that these colonists were not entirely ignorant of tobacco cultivation.

There was also founded at that time another tobacco plantation, named Malum, owned by the firm Baer, Senior & Co., and still another, which was of less importance, and for this reason we do not mention it herein.

It was to be presumed with justified reasons that these plantations would prove to be in time semiagricultural schools, wherefrom colonists would issue very much advanced in the cultivation, curing, and handling of tobacco, whose instruction would afterwards extend to the different towns of the Cagayan Valley, and even to the towns from where they had emigrated.

Before entering into the cause of the retrogression in leaf tobacco, and as a consequence that of the tobacco manufacture, I have need of making a statement:

Be it known now and forever that my writings do not attach, directly or indirectly, to any one given company, entity, or person.

I am one of the greatest enthusiasts for everything appertaining to tobacco.

I regret as much as anyone the great evil threatening others, and it is my duty to sound the alarm and at the same time to bare the facts in order to seek the remedies.

Having eased my conscience with this statement, we will now commence.

Those plantations which, as I have said before, were to be in a measure agricultural schools are in the same regrettable state of backwardness as that of a poor laborer who learned nothing more than the path shown him by his grandfather.

No machinery is to be found there. On the other hand, the ever-present carabao and the antiquated plow are there furrowing those extensive tobacco fields and not penetrating into the soil more than 12 or 14 centimeters.

There is not to be found a single rail or tramway nor any portable road whatever to gather and carry the product of the fields to the warehouses or shipping places.

No fertilizer is used, nor any irrigation, other than the fertilizing slime or mud annually left there by the great floods of the rivers and the rain sent down by providence.

If such is the case in the large plantations, what must be the conditions among the small, poor planters, who have no instruction, no capital, no animals, nor any kind of indispensable appliances to cultivate the land.

The foregoing are certainly ample reasons for not relying upon a good crop, but there are others worthy of a separate chapter.

PREPARATION OF THE SOIL FOR TOBACCO CULTURE.

To plow or dig the soil is good, for four reasons: (1) So that becoming spongy thereby, facility is afforded for the spread of the roots and for the circulation of air; (2) so that, bringing up and turning over the subsoil, the latter may be improved and thinned out by the heat of the sun; (3) to uproot the weeds which absorb the nutritive juices contained in the soil; (4) that by repeated labor the soil may retain its freshness, in order to impart to the vegetables the necessary juices during the heated term. The soil once prepared in this manner, the seed is sown, the plant takes hold, grows, and the fruit is borne by nature. Man has done nothing more than to combine the means.

The system of preparing the soil throughout the Cagayan Valley could not be worse. The tobacco lands there, if not used for corn after the tobacco crop, are left in a complete state of neglect; they fill up with weeds and with a dense growth of vines and other plants that do not allow the rays of the sun to enter, and that, moreover, suck all their substance, leaving them barren for the new crop.

Tobacco lands should be timely prepared, beginning to till them in the month of July or August for those in which corn was not grown, securing thereby two advantages: First, to kill the weeds by solar action; second, to air the soil thoroughly.

At present the major part of the lands commence to be tilled fifteen days or even less before the transplanting begins—a bad system, with fatal results.

We have already spoken about the deficiency of the old plow, which should be replaced by the modern moldboard of very easy handling, and which besides penetrating deeper into the ground has the advantage of turning over the soil very much better than the one now in use.

Land for tobacco cultivation should be plowed three times, with intervals of one month between them, for lands whereon corn was not grown, and at least fifteen for these latter.

We also recommend that after plowing the native harrow should not be used. This is a very general and harmful custom. By this means all that is accomplished is to pulverize and flatten out the soil on the surface, and it prevents the penetration of the rays of the sun. Every good planter should know that the solar action is the best fertilizer that the soil receives.

FERTILIZERS.

We have yet to learn that any large or small planter has tried any kind of fertilizer.

It may, perhaps, be argued that the plantations of the Cagayán Valley do not need fertilizer because the deposit of alluvium brought periodically by the great overflows is sufficient to fertilize the soil, and that the plants do not suffer through lack of nutritive matter.

While it is true that most every year those plantations are benefited by the floods, it is no less true that these lands are in need of foreign fertilizers. An ample proof of this is that in Gamú, Ilagan, and other plantations annually fertilized by the rivers the crops are degenerating.

It is most true, and confirmed by thousands of experiments, that the cultivation of tobacco, carried on with the best conditions of soil and climate, is perfected greatly in quantity and quality if the planter employs scientific means in the nutrition of the plant.

Of the different analyses made of tobacco we draw the conclusion that the most select leaf is that cultivated in lands abounding in soluble salts of potash, which, besides promoting rapid development of the leaves, give them great fineness, flexibility, and aroma, without thereby increasing the quantity of nicotine.

Potash salts are obtained in the ashes of any kind of forest plants, burnt bamboo and others, and the richest in this substance are the very stalks of tobacco and corn.

Every tobacco planter will have noticed that when, after the great floods in their fields, the stalks, branches, and brush left thereon are burned there, the plants planted among these ashes acquired greater development than the rest. Their color was a deeper dark green, and the greater flexibility and fineness was clearly apparent.

Well, then, this having been observed, it is not difficult to select the fertilizer, and its acquisition is within every planter's reach.

We recommend as one of the best systems the formation of the "hormigueros," or heaps of burnt earth, a very antiquated mode of fertilizing the fields and of positive results in tobacco culture.

There is a more simple way still: Cover the surface of the land to be cultivated with a not too thick layer of branches, dry leaves, grass, or bamboo, and place on top another layer of dry earth, 1 or 2 inches deep; burn in proper season, and two or three days after this operation give one turn with a plow. By this means uniform fertilization of the whole field will have been obtained, and also the destruction by fire of innumerable grubs and larvæ of insects, which are tobacco's worst enemies.

TOBACCO SEED AND SEED PLOTS.

We consider the selection of seed of the greatest importance. It should be chosen from the most healthy and developed plants in each field, and the planter should mark them, even before budding, thereby preventing the mistake of rendering the seed useless when the women come to remove the sprouts or shoots and the buds. The selection of the seed should be made with great care, because of the immense variety and completely distinct conditions.

The seeds known as Maroquí, Vizcaya, and Havana, this latter known likewise by the name of "heart," due to its shape, are those which produce the largest quantity of light, fine, and clean wrappers.

The seeds known by the names of Romero, Morada, and Casira furnish an aromatic leaf suitable for fillers of good cigars and for select cut tobacco or "picadura."

These plants bud very soon, but if the transplanting is done in the second half of November or first half of December, the cool north winds moderate their growth, they take deeper hold, and after that their development is greater, many times reaching up to twenty leaves in the first cutting.

As to the seeds Pampano and Espada, they should be discarded altogether. The first named gives a leaf similar to that of the cabbage, very much wrinkled toward the stalk, very coarse, and with very thick cross veins. The second named gives a very narrow leaf of "maduro" color and heavily charged with nicotine, for which reasons it is used solely for chewing tobacco.

Now that good wrappers are so scarce, we recommend to the municipalities to provide themselves with Sumatra seed. It produces a very fine, light-colored leaf, and if the transplanting is done early the leaves attain fairly good size.

This kind of seed was planted rather extensively in an important plantation in the Cagayán Valley and, in my humble opinion, the results were very satisfactory, and they would have been much more so if the transplanting had been made to soil of more strength, or that known there by the name of "jugus," wherein the plants obtain very much more development.

It has never been explained why this seed was discarded. I believe that it was an unfortunate mistake and that dire results will now be experienced.

SEED PLOTS.

There should be at least three, the first to be sown between the 15th and 20th of September, for, bearing in mind that the seed if well cared for obtains in between forty and fifty days, this enables the commencing of planting in the second half of November. We have already said that these plantings should be alternate and at intervals of about fifteen days each.

The selection of seed is not practiced at present. The planter, without caring to see if the plant is sound or diseased or noting this or that condition, gathers the seed from the field, and it is very frequently the case that it is taken from the sprouts or from the discarded plants. Hence the diversity of classes found even in small fields.

The seed plots outside of the plantations are formed in very bad conditions as to soil and weather, so that the planter who has been cautious and has secured his seed in good season has need of becoming a constant sentinel, and even then at the slightest lack of vigilance he is robbed of it. These thefts are likewise very frequent even after the transplantings.

All these evils would be avoided if the municipalities would follow the good custom of making common seed plots, as was done during the time of government monopoly and described herein.

TRANSPLANTING.

We have said that the transplanting of tobacco should be made in the high lands during the second half of November and in the low lands during the first half of December. This latter can be extended up to the 24th of the month at the latest.

These are called early plantings, and many years of experience have shown us that they are the best, for three distinct reasons: First, because after the recent rainy season the soil retains all the humidity; second, because the cool northern winds modify the growth of the plant, which, seeking the warmth of the soil, takes firmer hold, absorbs the nutritive juices, and the development is much greater both in quantity and quality; third, because the season of northerly winds extends throughout the month of January, bringing therewith some showers of fine rain, highly beneficial to the plants.

Now, unfortunately, just the reverse occurs. We frequently see that lands to be planted with tobacco are still entirely neglected, full of brush, and the planter does not even trouble himself to give it the first plowing.

These lands are afterwards cleared, plowed, and prepared at times in less than a week. The transplanting is poorly done, the soil is raw, has not been benefited by the sun's rays, and consequently is not vegetable soil. The roots of the weeds previously torn out again take hold immediately and the field is once more full of brush. The greater number of the plants die, and those that do not perish grow up stunted, diseased, and develop unevenly. The tobacco is extremely poor, of a yellowish color, gummy, slow to burn, and very bitter.

It is very risky to mix this tobacco with others, because it is very liable to heat and also to impart to the others its bad conditions of color, odor, and taste.

The delay in the transplanting is due to nothing else than the little care given to the seed plots; sometimes owing to baguios, others to excessive rain, others to drought, and always to neglect; it happens that when the season for sowing arrives there are very few who have the seed ready, so that transplanting is done in the months of February and March, when the cutting of the first leaves should begin. Hence, the crops are scarce, of poor quality, and of divers kinds and conditions.

Another feature of the greatest importance is the distance to be observed between the plants. The general custom at the present time is approximately 1 vara (about 33 inches). This is practiced in all the lands as if they were of like condition. We agree to that distance as to the walks, but not between plants.

The beautiful plantations of the Cagayan Valley are formed of lands rich in organic elements of great nutritive strength, and in these lands we consider the distance between plants as excessive. Hence, it happens that the plants give out an excessive amount of foliage and there is need of frequent gleaning; otherwise a small forest would be formed.

Due to the excessive distance, the plants absorb a greater quantity than necessary for their nourishment, resulting in very thick leaves with very pronounced cross veins, of difficult application and usefulness for fine wrappers.

For the same reason the colors "maduro" and "colorado maduro" predominate, and we find the colors "claro" and "colorado claro" only in the leaves, called in Ilocano "lapa en ibanag" and "palaspas." These are leaves near the ground, and sheltered, therefore, from the sun and the wind.

The distances that should be observed are 80 centimeters for the walks and 65 centimeters between plants. With these distances will be obtained the following valuable advantages: First, in the same space a much greater crop; second, by the distribution of the juices of the soil affected by the increase of plants the leaves will be finer; third, through the shade mutually afforded the much-desired colors "claro" and "colorado claro" will be obtained.

The plantings having been made as explained in the preceding chapter, we must now look after the maintenance, cleaning, and cutting.

All the operations in tobacco culture are of such importance that we compare them to a complicated machine, wherein several geared wheels work together.

From the moment that the seed is put into the ground until the tobacco goes into the market in the shape of cigars and cigarettes it passes through many delicate manipulations.

So that in order to explain the causes of the depreciation of Filipino tobacco within the last few years and to suggest the remedies, based on many years of study and experience, it becomes necessary to publish various articles, which we do not doubt will be read with interest by all those engaged in the culture and manufacture of tobacco.

It many times happens that the plants carry from the very seed plot the grubs and larvæ of insects, the destruction of which is very necessary.

When the seed plot is attacked by the worm and it is desired to prevent the propagation of the plague to the plantations, it should be destroyed within the seed plot itself; for which purpose a not very thick lye of ashes and boiling water should be made, and when cold the seed plot should be irrigated therewith. It is only in very rare cases that this has to be repeated.

If the field wherein the transplanting has been made has been previously fertilized with ashes and burned earth, as we have suggested, it can be guaranteed that the worm will not make itself very visible, for the potash salts, besides being the best fertilizer for tobacco, have the quality of destroying the parasitical insects of the plant in over 60 per cent.

Besides attending to the removal of the worms morning and evening, it is advisable to make bonfires at night at the margins of the tobacco fields, whereby the butterflies will be drawn into them by the light and perish in the flames, instead of depositing their larvæ on the plants.

Frequently one or two sprouts or shoots are allowed to remain on the plant, and this, although it increases the crop, is not at all advisable, because the leaves grow smaller and of inferior quality generally and those of the high grade diminish.

When the plants have entirely developed they bud, and it is advisable to at once nip the buds before they flower.

When doing this, care should be taken not to bud the plants previously marked for seed, and, as we have said before, these plants should be selected for the fineness, elasticity, and width of the leaves.

Once the budding has been done the sap becomes distributed into the leaves of the plants, and immediately they begin to mature.

Many times have I noticed that leaves were cut before maturity and others when overmatured. In both cases the leaf entirely loses color, aroma, and flexibility, which are indispensable conditions for manufacture.

We therefore recommend that the cutting be done when the leaves begin to lose their dark-green color and when seen from within toward the light small blisters are noted. It is then that the leaves are in condition for cutting. It should be done during the heat of the day, because it is very harmful to cut in the early morning hours, when the plants are covered with the night dew.

We likewise recommend the cutting after the full moon, because the tobacco plant, as all other plants in general, contains a greater quantity of liquids when the moon is crescent, which liquids are a source of innumerable difficulties in the curing, with marked tendency to decomposition.

DRYING HOUSES.

Ninety per cent of tobacco planters do not attach importance to the operation of airing and drying the leaves. Through badly understood economy they do not build drying houses, and those that are built do not have the necessary conditions for a good drying process.

They should be built in well-ventilated places, somewhat distant from rivers and as far away as possible from lakes and swamps.

They can be plain, i. e., of cane and bamboo only, but inclosed with lattice-work doors and windows, and not in the form of sheds, as a good many are constructed. The lattices should be as close as possible to prevent incoming rain and the humidity of the atmosphere.

It is well known that the green leaves of tobacco, when drying, absorb all the oxygen of the atmosphere, which makes breathing very difficult inside of the drying houses, for which reason we advise the planters to abandon the bad habit of drying tobacco inside of their dwellings.

The leaves in decomposition exhale gases charged with nicotine, and they are dangerous for people living there. It is this that causes the frequent pernicious fevers known by the name "Cagayan fever."

We have already said that the majority of the planters do not attach importance to the tobacco drying, whilst a good method in that respect is almost a guaranty of a good crop.

Tobacco is at present allowed to dry by the sun. If it rains they cover it (but not always) with a few banana leaves, which cover it so deficiently that in most instances it becomes completely soaked. At night it is left out exposed to the weather and receives all the dew sent down by God.

With that method of drying it is entirely impossible to obtain good tobacco, for the leaves with excess of humidity attain a variegated color, with black and greenish stains, they lose combustibility and aroma, and acquire a bad odor produced by mold.

The best system known to us, and which has given very good results, is the following:

Once the drying houses or camarines have been built in the form herein described, place inside a "pala pala" (scaffolding), made of bamboo, both vertically and horizontally, leaving a passageway along the whole center, with a connecting door at either end of the building.

The "hands" of leaves, composed usually of one hundred, are then hung on the different rings of the "pala pala," taking care that they do not touch each other.

Should the weather be damp and rainy it is advisable to introduce smoke into the building, thereby killing the vegetable parasites on the leaves without injuring in the least the good quality of the tobacco, provided that the smoke is not excessive, and the plants burned for that purpose were not resinous.

During extremely damp weather the doors and windows should be closed to avoid the circulation of damp air, and it should be endeavored to keep up a dry temperature by means of smoke.

Should the weather be dry with northeast monsoon winds, usually prevalent at that time, the doors and windows on that side should be closed and the opposite ones opened, thereby avoiding the hasty drying and shrinking of the leaves. It is advisable to interchange the "hands" of leaves that have been more exposed to the heat with those which were in a lower temperature within the camarine.

There is nothing easier than to obtain uniform drying within the drying houses or camarines by means of a thermometer and taking care to maintain, whether by ventilation in dry weather or by fires and smoke in wet weather, a maximum temperature of 36° and a minimum of 25°.

Should it be observed during the drying process that some leaves have become moldy through excess of humidity it is advisable to take them out and expose them to the sun, thereby killing in a few hours this injurious fungous vegetation.

THE PILING OF LEAF TOBACCO.

The leaves having been dried as described in the previous chapter the piling up, or "mandalas," is proceeded with.

The name of "mandala", is given to the piles of dried leaf tobacco removed from the drying storehouses.

The purpose of making up into mandalas is to make tobacco smokable by means of fermentation.

Mandalas should be two at least, and to this end a careful selection of all sound and clean leaves should be made, with which we will form the first mandala. In the second we may likewise place all leaves of inferior quality, as well as all such as during their drying may have become mildewed through excess of dampness.

The object in segregating the mandalas is to prevent the bad leaves transmitting their bad conditions of odor and taste through fermentation to the good ones.

The fermentation of tobacco in mandalas should be slow, as an excess of heat would injure it very much as regards color, flexibility, and weight.

It is therefore our advice that when 60° are reached, which is the maximum temperature to be allowed to tobacco, it should be overturned twice—when the temperature reaches 45° and 55°, respectively—a third one to be given at 60°.

It must not be taken that as the maximum temperature has been reached tobacco is now cured. Nothing would be more erroneous. The period of fermentation of tobacco in no case is under seventy-five to ninety days, and during such period it should be overturned in succession, until the fever gets down to the same temperature with which it started.

The fermentation of the tobacco having been completed, its selection and classification should now be proceeded with, put up into hands and getting it ready for appraisal and baling.

It has been thoroughly demonstrated that a maximum thermometer is indispensable to every good tobacco grower. Now, then, I may assume without the risk of erring, that outside of the plantations there are not ten thermometers in the whole of the Cagayan Valley.

With the proper use of a thermometer incalculable advantages may be obtained.

If our crops consist of thin leaves, elastic, and of a light color, nothing is easier than to preserve such conditions.

It is a known fact that at a maximum temperature of 60° tobacco obtains a high color, and the leaf loses part of its elasticity; combustibility and aroma, however, being increased.

In order to preserve the two former qualities we must endeavor not to allow the temperature inside the mandala to exceed 50°.

If the tobacco is gummy, it comes from high or thin lands, and if it is found with a decided tendency to become worm-eaten, there is nothing easier than to destroy the germs by means of fevers, and if the leaves are not sufficiently juicy, and it were therefore impossible to raise a temperature of 60° to 65°, a liquid obtained by the boiling of tobacco of good quality may be added by means of a fine sprinkler or a sprayer, in order that the leaf may become sufficiently damp to insure a good fermentation, and we will then have placed the tobacco in such a condition that it will not be worm-eaten for a long time.

We therefore recommend as an indispensable instrument to all good tobacco growers the use of a maximum thermometer, whereby they may observe their mandalas, on the assurance that they shall never become overheated, besides other advantages already pointed out.

APPRAISEMENT.

In the course of this essay we have set forth numerous reasons by which it is shown that the leaf tobacco raised in the Cagayan Valley can not be good; and it is evident that such tobacco, being the only one which could be exported

to the United States, as stated by the honorable Mr. Taft, there exists no reason why the American tobacco dealers should object to the reduction in the Dingley tariff.

An analysis of the causes and their effects having been made, the complaint turns out to be a very deeply rooted one. The disease has become a chronic one, and there is no remedy but to apply the lancet if we wish to extirpate the cancer that is gradually undermining the patient's life.

Anyone acquainted with the history of the Philippines is also aware that it is not many years ago when the provinces of Ilocos Sur and Ilocos Norte were rich, and very rich. Their chief production was indigo, which, whilst it was all handled by Filipino and Spanish merchants, was admitted to and in great demand in the principal markets of the financial world; classes 5 to 8, which are the superior kinds, being then quite abundant, and were compared in Europe to the unequaled "Blue" of Guatemala.

There came a third merchant—and we all know who he is—and with his unscrupulous conscience commenced, as always, his adulterations. He added lime and other substances, and a perfectly unknown indigo was offered in the markets. This caused its discredit, the outcome being its total disappearance.

Misery, with all the consequences thereof, did not take long to invade said provinces, and their inhabitants, almost to one-half of them, had to emigrate to other provinces in this archipelago.

This is the history of indigo, known to everyone, and this is the same course which the tobacco industry follows with gigantic steps.

After the close of the monopoly few were the firms who engaged in the leaf-tobacco trade. The following may be cited as the principal ones: *Compañía General de Tabacos de Filipinas*, *La Insular*, *Baer, Senior & Co.*, *El Oriente*, and a few Spanish merchants.

Whilst the leaf-tobacco trade was in such hands, everything went on nicely. The Philippine tobacco began to get a name all over Europe and almost completely secured the Far Eastern markets, frankly and loyally competing with tobacco from Habana, Lataquie, Virginia, Kentucky, Maryland, and other countries.

Then came the shrewd indigo merchant, who never starts but when an article is known and has an extensive good name, and then with his adulterations and frauds commences business without fear of making mistakes.

Thus he commenced his gatherings of leaf tobacco in the Cagayan Valley on a small scale at first in the same way as white ants make their first appearance in a sumptuous building until they finally get hold of it and demolish it.

The provinces of Cagayan and Isabela produce an average yearly yield of not less than 250,000 quintals, the value of which varies between 2,500,000 and 3,000,000 pesos.

It would seem at first sight that with such a handsome capital annually received by the inhabitants of both provinces, which do not reach 300,000, they ought to enjoy general prosperity. Nothing of the kind; said provinces are at present utterly poor.

The aforementioned unscrupulous trader, called a Chinaman, has secured all the trade the native needs to avail himself of and furnishes it to him at fabulous prices.

Should another merchant coming from a different quarter engage in the same business it does not take them long to overthrow him, and in this way complete monopoly is exercised.

They are also the sole money lenders, whose usual interest is that of 1 peso for a peso, and considering that they grant loans for six months at the most they earn an annual profit of 200 per cent.

There is even more. When the loan is made in goods they are in the habit of increasing the values to 25 per cent higher than the selling price, making barter compulsory, or to deliver tobacco for the total value of goods received, such delivery to be made on the 30th day of June at the latest.

Thus it results that the planter is compelled to dispose of his tobacco without proper curing, and, as a consequence thereof, the tobacco is raw, has a bad color, and is overcharged with nicotine, and in such a condition it is brought to the market.

Besides the great quantity of leaf tobacco obtained by them through the above means, they purchase in considerable proportion, competing with all the firms engaged in this business.

The class selected by them is the "4a Superior," a large leaf, a poor wrapper, but of good quality, and they pay for it higher prices than set down in the schedules.

This tobacco, obtained from the grower by means of flattery, offering him a deceitful profit, is used by them for mixing with the higher classes, thus doubling, or even trebling, the purchase price.

The lack of harmony which exists among the important firms, and the bitter competition made by Chinese, has given as a result that the leaf is classified or appraised too soon, the weed not having, therefore, been properly matured. The tobacco growers, on being pressed to dispose of their crops, arrange them carelessly; hence the diversity of class and color which is often found even in the same bundle.

The carelessness in the preparation of leaf tobacco, as well as the numberless causes we have described above, have given us the fatal result that the consumption of Philippine tobacco is already limited to our own home.

Tobacco being an article which should be offered for the market properly classified, we claim that it should be subject to regulations in its appraisal. In order to achieve this, we consider it as of absolute necessity that all tobacco dealers should form a guild, prepare a code under the laws of commerce, and appoint a tribunal formed by several of the best-known expert appraisers, to decide all matters connected with the legality of appraisals made.

The tobacco industry in the Philippines consists of more than 300 factories, located for the most part in Manila. Out of this number only four gather a portion of their stock in the Cagayan Valley, being compelled to complete in Manila the balance of the leaf tobacco they need for their own consumption. This fully shows that more than one-half of the crops is gathered in by Chinese dealers, and as they have the monopoly of the leaf tobacco in Manila they impose on purchasers, who have to submit to their classification and consent to having tobacco from Cagayan and Isabela mixed with leaf from Barill, Abra, and other places, as we have often witnessed.

The classification offered in this city is really scandalous, or, to say it more properly, an iniquitous robbery is being committed. As previously stated, the "4a Superior," which is a leaf of good quality, although broken, is mixed with the superior classes, above all with class "1a," which is of the same size.

The first-class tobacco is formed of whole leaves, clean and of a uniform color. The package or bale, as it is called here, weighs from $2\frac{1}{2}$ to 3 quintals. The average quintal consists of approximately 80 hands of 100 leaves each, and, taking as a base the package of $2\frac{1}{2}$ quintals, we obtain a total of 200 hands, which multiplied by 100, which each hand contains, would give us 20,000 leaves. As the leaves consist of two halves divided by the stem, it is evident that each half gives us at least one wrapper, in which case each package should afford as a minimum 40,000 wrappers.

However, you may well be frightened, but there is no exaggeration in what we are about to tell you.

Any factory turning out at present from 40,000 to 50,000 cigars of special brands needs to open at least 20 packages of 1a, which if properly classified should afford 800,000 wrappers. It may be seen, therefore, that the tobacco industry can not stand this a long time.

We are on a slippery road which leads us to a precipice unless we try soon to put a stop to this.

The tobacco industry in the Philippines is the leading one in importance, for the many millions invested therein, the large tracts exclusively producing tobacco, the many thousands of workmen who earn a living from it, and finally because it is the most important revenue obtained by the government. We consider that these are matters of such importance that our voice will echo sufficiently so that it may be heard by those persons who more or less are affected by everything relating to tobacco matters.

We are hopeful of having discovered a scheme which, if carried into practice, will yield great results, and by not publishing it herein we only take the precaution not to show our enemy our plans of attack and defense.

SAUCES FOR TOBACCO.

Although understanding that any technical person in a cigar factory knows such parts or matters of which tobacco is formed, we do not think it is out of the way to publish one of the most recent analyses.

ANALYSIS.

Inorganic bodies: Ammonia; azolic acid; alum; lime; hydrochloric, sulphuric, and phosphoric acids; potash; magnesia; iron; soda; silica, and manganese. Organic elements: Nicotine, tabaclic acid (mallic), citric, acetic, oxalic, pectic, and ulmic.

Neutral compounds which we name *meoctanine*, cellulose, yellow and green resins, wax or greasy matter, and nitrogenous matter.

Now, then, the most essential portions of which tobacco is composed being now known, there is nothing easier for an intelligent cigar manufacturer than turning a common cigar into an excellent veguero.

As a matter of fact, by means of such sauces, tobacco may be made old; by means of sauces aronia and combustibility may be imparted; by means of sauces it is possible to destroy the germs of the weevil and cause tobacco to keep for a long time; by means of sauces a white ash is obtainable; and finally, by means of sauces manufactured tobacco may be kept flexible and glossy, as if it were freshly manufactured.

It will not be out of place to hint that along with the sauces there should be thermometrical observations of the fever which tobacco must undergo, without which the study would be incomplete.

Few are the industries which, like that of the tobacco, offer a good field to study, or which, through manipulation, their products offer immense profits.

Therefore, being convinced thereof from experience, we urge our friends to go on constantly in their observations and study, assuring them that sooner or later they will attain the benefits we have enumerated.

There would be nothing easier to me than to publish a few recipes which have given positive results; but to include them it would be necessary to be acquainted with the class of tobacco we are to employ (since all tobaccos are not of equal conditions), and my work would be of no avail, besides being, on the other hand, manufacturers' secrets, so we do not feel warranted in giving them out.

We now consider this information as ended, and we should feel well pleased if, by the aid of our observations, we finally succeed in assisting the tobacco industry of the Philippines to again occupy the rank it so justly deserves to be in.

APPENDIX O.

AGREEMENT ENTERED INTO BY THE CIGAR AND CIGARETTE MANUFACTURERS OF MANILA ON MAY 18, 1905, FOR THE PURPOSE OF ENCOURAGING THE PRODUCTION OF TOBACCO LEAF IN THE PROVINCES OF CAGAYAN AND ISABELA AND TO IMPROVE THE QUALITY AND SECURE UNIFORMITY IN THE SORTING OF THE LEAF.

RULES RECOMMENDED FOR THE GATHERING AND SORTING OF TOBACCO IN THE CAGAYAN VALLEY AND FOR PURCHASES MADE IN MANILA.

In order to avoid the total loss of the esteem in which Philippine tobacco was held in olden times, ruining planters who earn their living therefrom, injuring more or less everyone concerned in the trade and the tobacco manufacturing industries, it is of the highest interest that all such elements should cooperate to improve the cultivation, preparation, and sorting of the tobacco leaf. The support of the authorities should be solicited, who, by simple measures of good government, enacted for the good of this country, may do a great deal toward causing said product to recover the good name it had when under the monopoly of the Spanish Government, and even for several years thereafter, until planters began to lose the habit to work and thereby the tobacco-producing regions their prosperity.

It is likewise necessary that purchasers should, by mutual accord, establish and observe rules to insure uniformity in their purchases and to compel planters to do their best, as formerly they did, in the work of cultivation and the preparation of the leaf.

It is not our intent to reduce present prices, such as the bad quality of the weed during late years would warrant, for the reason that production would thereby be killed; our main object is simply to encourage production. We therefore recommend that existing prices be kept up according to the estab-

lished classification which is now more or less strictly accepted as a basis for appraisement.

An agreement should also be made in order to avoid the intrusion of middlemen in purchases made, such persons being as prejudicial as brokers are between the purchaser and the planter, not merely because the commission they charge uselessly enhances the price of tobacco, but also because such manner of appraisement lends itself to hiding the impositions and derelictions of subordinates and because it hinders the direct dealing between the buyer and the seller, which is the most convenient, proper, and just way to effect purchases.

Something should also be agreed to in order to put a stop to the imposition of the gatherers (acaparadores), mostly Chinamen, who, after buying to advantage and often in exchange for goods of a doubtful quality, trusting that at the present day everything is allowed to pass, sort and pack the tobacco leaf to suit themselves and increase their gains when selling in bulk.

In view of all the above reasons, the purchasers who sign this writing agree to establish the prices and rules given below and engage to observe the same during one year, without prejudice to an extension of time by means of a new agreement.

First. The appraisement of leaf tobacco in sticks, counted or in bulk, is absolutely suppressed, such appraisement to be made only by hands (manos) of 100 leaves, well arranged and pressed.

Second. Purchases to be made solely from planters under a fair appraisement by classes and at the following prices:

Bale of—

Primera -----	₱14.25
Segunda -----	9.00
Tercera -----	4.12½
Cuarta superior -----	2.00
Cuarta corriente -----	1.50
Quinta -----	.50

Third. No brokers or middlemen of any kind whatsoever to be employed, and no lots are to be purchased at lump prices, not even from planters themselves.

Fourth. The "tips" (rewards) which have been given in late years to the planters, as well as payment for the transportation of tobacco delivered for appraisement in the drying warehouses, are to cease.

Fifth. As far as possible purchasing in Manila is to be avoided. Should any of the firms signing this agreement be in need of leaf tobacco, notice should be sent to all the other firms and, in case it should be convenient, the other firms will furnish the tobacco needed, and if not convenient the purchase should be by appraisement, selecting at least 20 per cent for each class of leaf.

SUGGESTIONS FOR IMPROVING THE CULTIVATION OF THE TOBACCO PLANT IN CAGAYAN AND ISABELA.

The government to advise planters as follows:

1. Not to plant tobacco in too poor or worn-out lands.
2. An annual rotation of seed between the different municipalities, such as Echague-Cabagan; Angadanan-Tuguegarao, etc., in order to avoid degeneration of the plant.
3. Fields to be previously well prepared for planting, the earth loosened so as to expose it to the influence of the atmosphere and the rays of the sun.
4. To keep the fields well cleaned.
5. To see that seed beds or nurseries are in perfect condition and sprinkled with a solution of ashes and water which kills all insects or larvæ.
6. Transplanting to be carefully done, selection being made of sound and vigorous small plants having well developed and uninjured roots, so that they will catch and feed well.
7. Plants to be well hilled.
8. Plants to be pruned in time so as to limit the number of leaves each one should produce of perfect condition and quality.
9. Leaves to be cut off when the right conditions are reached.
10. To avoid putrefaction which would weaken the cellular tissue of leaves, thereby losing elasticity, leaves should, without loss of time, be strung on sticks.
11. Such sticks should be hung up in a well-ventilated drying warehouse, not allowing the rays of the sun or night dew to enter therein.

12. To strictly prohibit that such sticks be hung up on bamboos in the open air.
13. As soon as the leaves have dried, sticks should be formed into mandalas of good size and well covered up so that fermentation may set in, and they should be turned over at least once.
14. Classification to be made under the old estanco system (under Spanish Government monopoly).
15. That the purchase of leaf tobacco strung on sticks be prohibited.

APPENDIX P.

MEMORANDA FURNISHED BY COMPAÑÍA GENERAL DE TABACOS DE FILIPINAS REGARDING AMOUNT AND QUALITY OF TOBACCO LEAF RAISED IN PROVINCES OF CAGAYAN AND ISABELA.

ISABELA AND CAGAYAN TOBACCO LEAF.

1. It is not possible to state accurately the annual production of leaf tobacco in the provinces of Isabela and Cagayan. It depends upon the weather; if it be favorable an abundant crop is the result, otherwise it becomes diminished to one-half or even one-third. However, taking five successive crops as a basis, an average annual yield of about 200,000 quintals may be estimated.

2. Proportion of cultivated tobacco that can be utilized:

(a) For wrappers, 10 per cent; only one-half of 1 per cent being suited for fine-grade cigars.

(b) For fillers and (c) for cut tobacco, etc., 90 per cent.

3. The proportion of (a), (b), and (c) used in manufacture is 35 per cent for (a) and 65 per cent for (b) and (c), or filler and remnants. Of the 35 per cent only two-thirds can be utilized.

4. The Compañía General de Tabacos de Filipinas has done everything possible and has used all available means to improve the quality of tobacco, instructing the planter as to the manner in which he should cultivate it, and even furnishing thermometers exclusively for tobacco in order to gauge the temperature it should undergo in its various fermentations, and rejecting, when presented for sale, tobacco not in proper condition or which had been badly handled. Thereby some improvement was obtained both in cultivation and curing, but within the last few years, during which local consumption has increased, due perhaps to the greater number of smokers, and since the buyers commenced to purchase the leaf in any condition, without proper seasoning or curing, including purchases of the uncut leaf in the field, the planters, seeing that they were paid alike whether they took proper care or not, became careless, and, disregarding the quality of the leaf, sought only to make money. We are now suffering the consequences by the ill-repute of Filipino tobacco in all the markets of the world. Those who have contributed the most to this great injury have been the Chinese, who do not conform to commercial usages, and who have discredited and demoralized this market.

5. The means of transportation are very deficient, due to the poor condition of the highway and the lack of tributary roads. There is but the one waterway available, only in the rainy season and when the rivers overflow.

The means of transportation could be improved by the construction of a railway from Echague to Aparri, and immediate results could be obtained by a good dredging of the entire length of the river, so that it might be navigable in all seasons of the year.

6. There is great difficulty in meeting the demand for the different "claro" and "oscuro" colors through scarcity of wrappers. The demand for "claro" colors is greater day by day, for where formerly in the Philippines "maduro" was solely sold now only "claro" is demanded. There has been much decrease in the production of light-colored, clean, nice leaves of fine texture since the discontinuance of the monopoly. Since that time tobacco-leaf culture began to be neglected, and especially has this been the case since 1900, owing to the rise in prices and to local competition.

The methods of cultivation employed by the independent planters have greatly depreciated, and the advice and perhaps the cooperation of the provincial authorities are needed to better the situation.

APPENDIX Q.

CULTIVATION OF TOBACCO.

[By Clarence W. Dorsey, soil physicist, in charge of soil investigations. *Farmers' Bulletin No. 5, Bureau of Agriculture.*]

INTRODUCTION.

In the present paper an effort will be made to describe briefly the methods employed in modern cultivation of tobacco, to treat of recent successes in growing tobacco under shade in the United States, and also describe the conditions of tobacco culture in Sumatra, with especial reference to the industry in the Philippines.

In the preparation of this paper the bulletins of the United States Department of Agriculture relating to the cultivation of tobacco have been very freely used, and much information has been obtained from the gentlemen connected with the leading tobacco companies in Manila.

Philippine tobacco has long been held in high esteem in the Orient, and Manila cigars maintain the same rank in eastern countries that Habana cigars occupy in Europe and America. To-day tobacco stands third among the exports from the Philippines. During the year 1900, according to the Monthly Summary of Commerce and Finance of the United States, 11,743,336 kilos of tobacco, valued at \$1,906,436 United States currency, were exported from the islands. Tobacco was introduced into the Philippines shortly after the Spaniards took possession, seed having been brought from Mexico by Spanish missionaries. Little effort was made by the Government to restrict or encourage the cultivation of tobacco until 1781, when the cultivation and sale of tobacco was decreed a state monopoly. While this monopoly was in force the natives in the large tobacco districts of Luzon were subjected to great inconveniences and even hardships. Each family was compelled to grow 4,000 plants and deliver the entire crop to the agents of the Government. None of the crop could be reserved for the use of the planter, and a fine was imposed when the crop was short. After the crop was harvested the leaves were selected and bought by Government agents, and bundles of inferior leaves were rejected and burned. Native houses were searched for concealed tobacco and fines and penalties imposed on those who did not comply with all the requirements of the monopoly. Early in the nineteenth century many riots and disturbances arose out of the difficulties in meeting the harsh provisions of the law.

In the Visayan and southern islands the monopoly was not in force, but tobacco raising was not generally practiced until the middle of the nineteenth century. The profits from the monopoly annually amounted to several million pesos, but was finally abolished on December 31, 1882. Since that time the cultivation and manufacture of the crop has been in the hands of private individuals and companies. At the present time the greater part of the tobacco grown in the islands comes from Luzon. The products of Isabela and Cagayan provinces are the most highly esteemed, while considerable quantities are produced in Union and the Ilocos provinces, on the west coast of northern Luzon. Nueva Ecija formerly raised a fair grade of tobacco, but the cultivation has fallen off in late years. The writer saw in Batangas Province many small fields that would aggregate many hundreds of hectares of tobacco. This is largely used for local consumption and is of inferior quality. Tobacco is grown in small quantities in the Visayan and southern islands, the greatest amounts probably being produced in Masbate, Tablas, Panay, Bohol, Leyte, Siquijor, Negros, and Mindanao.

Philippine tobacco is nearly all utilized in the manufacture of cigars and cigarettes, and finds a ready sale in Spain (which consumes more than one-half of the total production), England, Hongkong (where it is shipped to Asiatic ports), and British East India. During the year 1900 these countries bought more than seven-tenths of the entire crop. The agreeable aroma and flavor of the better grades of tobacco grown in the islands have won for it a high place among the fine cigar tobaccos of the world, and for a long time it ranked next to the celebrated Cuban tobacco. When we consider the desirable qualities of Philippine tobacco with the imperfect cultivation, curing, and fermentation it receives and the improvements and advances that have been made in other tobacco countries, it becomes at once evident that every care and attention

should be given the crop to enable it to regain its former position, if not to make it superior to the finest tobaccos grown in the world.

The markets of the United States offer every inducement for the improvement and spread of the Philippine tobacco industry. This becomes all the more evident when we consider the vast sums of money annually expended by the United States for foreign tobacco. During the year ending June 30, 1900, the United States, according to official statistics of the agricultural imports of the United States, paid for Cuban tobacco \$7,615,991, United States currency, and \$4,569,271, United States currency, for Sumatra tobacco. During this same year the Philippines exported to the United States only a few hundreds of dollars worth of tobacco, or less than one-hundredth of 1 per cent of the tobacco importations of that country. While it may be true that Philippine tobacco may never entirely supplant Cuban and Sumatra tobacco in the United States, there is certainly every inducement to encourage and improve the industry until modern cultural methods have realized to the fullest extent the highest perfection of the crop.

REQUIREMENTS OF THE TOBACCO MANUFACTURER.

In the manufacture of high-grade cigars certain essentials are necessary. The tobacco must burn smoothly and freely, with a pleasant taste, not rank and strong, nor too mild. When the taste is pleasant, not sharp and bitter, the aroma will invariably be good. The cigar that possesses the above qualities will meet with a ready sale. The wrapper of the cigar, as distinguished from the filler, must be light in color, rich in grain, thin in texture, small in vein and stem, very elastic, and of good burning quality. It should stretch and cover well, have little aroma, and appear well on the cigar. The most desirable sizes are 40 and 45 centimeter leaves, for from such leaves the manufacturer can obtain four cigar wrappers from each leaf, with but little waste. After such a suitable wrapper leaf is grown it must be properly cured, assorted, and classified. The manufacturer can never afford to pay a high price for a bale of tobacco unless he can calculate just how many suitable leaves it will contain. This is one reason why Sumatra tobacco commands such a high value, for so carefully is the grading and assorting done that the manufacturer knows how many cigars each package of tobacco will wrap, and that the color will be uniform. Wrapper tobacco should be uniform in size, color, and texture; then the buyer knows what he is getting and is willing to pay a good price.

For cigar fillers the leaves should be somewhat shorter, of medium body, have a rich brown color, and burn smoothly and freely. The quality of the filler determines the character of the cigar; hence the filler must possess the desirable aroma that distinguishes a good cigar.

The Philippine tobacco has some of the above properties and has earned its reputation on account of its agreeable aroma, fine veins, and notable elasticity. This applies only to the better quality of tobacco grown on the alluvial lands of the Cagayan River in northern Luzon. The tobacco grown in the Visayan Islands is coarser, uneven in color, and of greater strength. From the provinces along the west coast of northern Luzon the tobacco is of heavy body, and that grown near the sea has but little combustibility. Its ragged, broken character also lowers its market value. The tobacco grown in Nueva Ecija was formerly considered fine, but the color was a decided yellow and the taste somewhat bitter.

PREPARATION OF SEED BED.

No step in the cultivation of tobacco is more important than proper care in the preparation and sowing of the seed beds. This work can not be neglected without running the risk of a partial or total failure of the crop. To make good seed beds is a laborious task and requires good judgment in the selection of the location, soil, and in the preparation of the land. To have plenty of good, strong, healthy plants is the surest foundation for a good crop of tobacco, provided they are from seed true to the desired standard. It is very important that in the preparation of the seed bed an abundant supply of seed should be sown and provisions made for a succession of plants, so that when the planting season comes the supply of plants suitable for transplanting will be ample for the purpose and the supply will be maintained throughout the period in which the planting is to be done.

The best soil for the seed bed is a rich, friable, dark, virgin loam or sandy loam. A deep, well-drained soil is greatly to be preferred. The necessary oper-

ations of tilling and stirring the soil should precede sowing the seed by several weeks. It is usually customary to thoroughly plow or spade the land and mark the land off into a number of beds surrounded by boards. In the famous Deli district in Sumatra the beds are built up about 30 centimeters high and surrounded by ditches. The size and number of the beds vary, but they are usually rectangular in size, with suitable walks or passageways between them. The beds are highly fertilized with rich manures or with any complete, specially prepared commercial fertilizer. Stable manure or any complete guano may be used. Care should be taken to thoroughly mix the fertilizer with the soil, so that the greatest amount of plant food may be available for the young plants. In the case of old lands it is always advisable to burn the land over to insure safety against grass and weeds. With new land the trouble from such sources is slight, but burning is sometimes practiced to increase the richness of the soil by adding the fertilizing properties of the burned wood. The burning is usually done one week before planting the seed. After burning, the soil is well spaded and all roots and tufts are carefully removed, and the surface made loose and smooth. Then the soil is well watered and the seed, mixed with sand or sifted wood ashes, are nicely spread over the surface. After the seeds are sown the soil should be thoroughly compacted with a heavy roller, and if the soil is at all dry the beds should be watered and kept continuously moist, but not wet, until the plants are set out. It is best to plan new seed beds at intervals of every few days, in order to be sure to always have fresh plants of proper size on hand when the time comes for transplanting. On a commercial scale it requires about 45 grams of seed to sow a bed 1 hectare in size. In the Cagayan Valley the seed is sown in the beds during the latter part of September and the first weeks of October, while the transplanting is made during the early part of December. This period of planting the seed bed varies slightly in the different parts of the archipelago on account of the varied climatic conditions; but practically all of the transplanting is done during the month of December, as experience has shown this to be the best month for such operations. In many parts of the Philippines it will be found advisable to construct some sort of cover for the seed bed to protect the seeds and tender plants from the intense heat of the sun. A suitable shelter made of straw, cogon grass, or nipa palm, raised about 1 meter above the ground, will suffice. It should be so arranged that the covering can be put close together or spread out to regulate the amount of heat received by the small plants. After a few weeks this covering can be removed altogether and kept to serve for another bed. White ants and sometimes caterpillars and worms are destructive in the seed beds, and should be removed by hand or by mixtures of poisonous substances and water known to be effective in removing such pests. When the plants are drawn for transplanting great care should be taken to secure as much root as possible. It is usually considered the best practice to carefully wash away all particles of the seed-bed soil that cling to the roots, for the plants live and grow better when the roots are perfectly clean.

SELECTION OF THE LAND.

Few, if any, plants are so easily modified as tobacco by climate, soil, elevation, nearness to the sea, and different methods of cultivation. This is plainly demonstrated by the rapid changes which take place in the character of the leaf, flavor, aroma, and special fitness for the varied uses and for different markets in introducing seed of well-marked varieties into new districts. Each new class of soil, materially aided by climatic conditions, gives peculiar qualities to the cured leaf as to its flavor, texture, color, etc.

It has long been recognized that tobacco grown near the sea or large bodies of salt water has poor combustibility, and, while the taste may be sweet, it commands a low price for the manufacture of cigars on account of its poor burning qualities.

In tropical countries the favored locations for tobacco cultivation are the interior alluvial valleys. In such places the soils are usually deep, porous, easily stirred and cultivated, and the periodic overflow of the rivers adds new fertilizing elements to the soil, already rich in plant food. The famous tobacco districts of Isabela Province belong to this class, as well as the valley lands of the provinces of the west coast of Luzon. In the Cagayan valley the quantity of rainfall, according to two years' observation ending in 1897, is much less than at other points in the interior of Luzon, or in the southern islands. The total amount of rainfall during the year is 700 mm., the greater part of which falls

during the period from June to October. During the months of January, February, and March, when the tobacco is growing and ripening, the rainfall does not exceed 20 mm. Comparing the climate of this region with the Deli district in Sumatra, it will be found that the climatic conditions of the latter region more closely resemble those of southern Luzon and some of the southern islands. The rainfall is distributed over the entire year, while the greatest amounts are recorded in October, November, and December. The total amount received during the year averages more than 2,000 mm. The stations in the Philippines, where equivalent or greater amounts of rainfall are recorded, are Bolinao, in Zambales Province, Albay, in southern Luzon, La Carlota, in western Negros, northeastern Mindanao, and Vigan, in Ilocos-Sur Province.

In Sumatra, where the best results with tobacco have been obtained, the soils are mainly volcanic in origin. Where the finest and silkiest tobacco of a rich brown color is grown, the soils are clayey, while the lighter colors of fine cigar-wrapper tobacco are grown on loamy and sandy soils with clay subsoils. In the clayey soils of the Deli and Langkat districts, tobacco can often stand droughts of three weeks and longer, without much injury, but in these districts the frequent light showers are of great value to the growing crop. Experience has also shown in Sumatra that the best results have been obtained on land situated from 8 to 16 kilometers from the ocean, while tobacco plantations high up on the mountains have had poor success in growing fine, silky wrapper tobacco. The lowlands, free from frequent inundations and not too near the sea, with soils consisting largely of fine sand and silt, and rich in organic matter, have given the best results.

In the Philippines many fine bodies of interior valley land, with rich, loamy soils, can be found where tobacco cultivation has not been practiced, and it is on such tracts of land that its introduction is especially recommended. Mindanao possesses many large valleys with alluvial soils that could undoubtedly be made to produce a fine quality of tobacco. The soils of the large valley between Manila and the Lingayén Gulf should be carefully tested with seed from the famous tobacco districts of the world, to determine its fitness for growing tobacco. New areas are constantly being tried in various parts of the world, where tobacco growing was unknown, and the success of so many of these should prove an incentive to greater efforts on the part of the Philippine planter to enter into competition to furnish a goodly portion of the world's supply of this profitable crop. Only very recently the cultivation of Habana tobacco has been introduced into Annam and Tokin, in French Indo-China, and a portion of the crop exported to Manila. Such an example shows what may be accomplished by careful experimentation in the field of new crops, and should stimulate the energies of farmers in every part of the archipelago.

CULTIVATION OF THE CROP.

Since the profits of growing tobacco depend largely on the planter's ability to produce a leaf of such qualities as to make it desirable to the manufacturer, it follows that the greatest care should be exercised in the cultivation of the plant. Prior to the work of transplanting the ground should be thoroughly plowed or spaded to a considerable depth. Deep cultivation is advisable on any character of soils, as it readily allows the free percolation of rain and air through the soil, and increases the amount of available plant food contained in the soil, and helps to conserve the moisture, especially in times of drought. If only small amounts of manures are to be applied, it can be spread broadcast after the first plowing, but if large quantities of stable or straw manures are used, it is best to plow them in several weeks before the time of setting out the plants. After plowing, the land should be harrowed with a disk harrow, and then with a smoothing harrow. In Sumatra, where all of the operations are performed by Chinese coolies, the work of breaking the soil is performed by an implement called the "tyankol," a sort of spade, which takes the place of the plow, while the work of smoothing and reducing the soil to a fine state of tilth is accomplished by hoes and iron rakes. Either by plows and harrows or by spades and rakes, the field should be made loose and smooth before transplanting, or the young plants are at a disadvantage from the very start. The writer has seen many fields, especially in Batangas Province, where young tobacco plants were attempting to grow in a field filled with the hard clods of intractable clay soil. Such methods are to be condemned, for plants as tender and delicate as tobacco can not make a good growth in improperly prepared fields.

Often it will be found advisable to water the field before the work of transplanting begins. Transplanting can be done by hand or by a transplanting machine. Such a machine can only be used on level fields free from stumps, stones, or large quantities of undecomposed vegetable matter. By its use more satisfactory results are obtained, and large areas can be planted at much less expense than by hand planting. A transplanter is a two-wheeled machine, drawn by horses or mules. One man drives, while two boys drop the plants. Plants are set with mathematical regularity at any distance desired. The machine is so arranged that a supply of water is furnished at the time of planting, so that the plants are thoroughly watered while being placed in the soil. Machines of this character are widely used in the United States for setting out tobacco, cabbage, and tomato plants, with exceptionally good results. Machine-set plants start quicker and grow and mature more evenly than hand-set plants. In fig. 1 is shown the method of transplanting tobacco plants by machine.^a

In Sumatra, where all necessary operations are carried on by hand, the cooly is provided with a plant string the same length of the field. Each end of the string is securely attached to a stick of the same length that it is intended the rows shall be separated. This string is divided into intervals by means of colored string, to show the proper distance of the plants in the row. By means of a sharp stick, holes are made at the proper distance, about 10 centimeters deep and 7 centimeters in width. The holes are watered immediately before the plants are put in. The plants are pulled from the bed when the dew is still on them and set out late in the afternoon, when the rays of the sun are not very strong. During the daytime the pulled plants are kept in a basket and carefully watered and covered with cloth. About 4 o'clock in the afternoon the cooly drops from the basket a plant beside each hole and, when all of the plants are dropped, commences to plant. He holds the plant in the center of the hole with his left hand, and with his right hand presses the soil around the roots, carefully, but firmly, so that he can give the plant a slight pull without removing it.

As regards the number of plants to the hectare, this depends so largely on experience and the character of the soil and the kind of tobacco that special directions can not be given. Close planting in the row tends to develop a very thin leaf, while open planting allows the leaves to grow to a greater size and develops the gums and oils so common to tobacco. For cigar wrappers it is usual to plant closely in the row, in order that the leaves will shade each other and develop the fine, thin leaves desired for this purpose. In Sumatra as many as 10,000 plants are set out in a field of $1\frac{1}{4}$ acres (slightly more than one-half of a hectare). For cigar fillers or for tobacco to be used for manufacturing purposes the planting is much more widely separated than in Sumatra.

As it is always desirable to get a uniform growth, great care should be exercised to have each plant live. Replanting should be done as quickly as it is possible to determine where fresh plants are needed. If the soil is moist and showers are frequent, watering the plants is unnecessary, but if the ground is dry they should be watered immediately after setting and each day thereafter as long as the plants require it. The quantity of water used is in all cases governed by the condition and nature of the soil. Usually after setting, the plants are undisturbed for a period of several days, during which time they are taking root. After this time cultivation should be begun and continued rapidly and frequently until further cultivation is liable to injure the growing leaves. Cultivation at first can be done by a light plow or hoe, but after the plants have reached a considerable height only the hoe should be used and this very lightly. At this period the leaves furnish sufficient shade to prevent the soil from baking and hindering the growth of the surface roots.

Every effort is made, both through fertilizing and cultivation, to maintain a steady and rapid growth, as any check in the rate of growth tends to thicken the leaf and reduce its elasticity. Stable manures are commonly used, while fertilizers known to be rich in potash are especially to be recommended. In many parts of the United States it is customary to apply specially prepared fertilizers after the plants have attained considerable size to still further stimulate the growth of the crop. In Sumatra the crop is given three cultivations. The second cultivation is made at the time the plants are about 30 centimeters high. Just before the second cultivation the cooly carefully removes the lower

^a On file in the Bureau of Insular Affairs, War Department.

leaves, places them around the stem, and packs the loose soil on these. At this second cultivation the suckers are broken off and buried in the same way as the leaves, so as to protect the stem. The work of topping and suckering varies considerably with reference to individual plants and the character of tobacco desired.

Early or low topping is not desirable, as it throws too much growth into the leaves, making them coarse and large. If the plants are thrifty and the weather favorable for growth, it is frequently advisable, if thin, fine-textured leaves are desired, not to top the plants at all, but let them produce their flowers and seed pods. If, however, the plants seem weak and it appears that they can not mature the full number of leaves, they should be topped by pinching out the "buttons," allowing to remain as many leaves as the plant will be able to mature. When plants have been topped too low and the leaves thicken and curl, a few suckers may be permitted to grow, which will remedy any thickening and curling. By using good judgment in the matter of topping and suckering and making proper allowance as to the soil and climatic conditions the leaves can be grown to almost any thickness that is desired.

From the time the plants begin to grow in the seed bed until they are harvested they should be examined carefully for worms, insect pests of all kinds, and all of the diseases which they are subject to. Worms may be removed by hand or by applications of mixtures containing poisonous substances, such as Paris green. For diseased plants frequently there is no other remedy than to remove the plant and reset other plants. But if the resetting is done too late the small plants never amount to much.

At the time of topping or when the buds have made their appearance a few plants are usually left for seed. Only the best, finest, and healthiest looking plants are selected for this purpose. These are allowed to grow and blossom at their full height. Sometimes all of the leaves are removed, but usually only the bottom leaves are taken off. When ripe the little balls containing the seed are carefully cut off with a knife or other sharp instrument. The cutting must be done carefully, so that the seed will not fall out. The seed pods are then spread out in the sun, and when thoroughly dried the seeds can be removed. The seed should be cleaned, preferably in a small seed mill and only the heaviest seed preserved for the next planting.

HARVESTING AND CURING.

More satisfactory results are obtained when the leaves are "primed" than when the entire is cut. By cutting the entire stalk much green tobacco is carried the shed, since all the leaves never ripen on the plant at the same time. By the system of priming the leaves are taken off the stalk as soon as they ripen and carried to the drying sheds in baskets. Sometimes half of the leaves are removed and the balance of the stalk cut and the leaves cured on the stalk. Tobacco should never be cut or primed when wet with rain or dew, as this causes the leaves to sunburn and little holes to form, which lowers the value of the leaf. If the tobacco gives promise of being "wrapper"—that is, if it is light green, very sound in leaf, and of desirable size—it should be primed at an early stage of ripening. If, however, appearances indicate that it will prove "filler" tobacco, it should be allowed to thoroughly ripen.

In the Cagayan Valley it is customary to make five gatherings of the ripened leaves at intervals of eight days. The native cuts the leaves while they are hot and drooping, collects them on his left arm until the bundle is too large, when it is placed on carts and hauled to the sheds.

The different primings should be kept separate in the shed, so that they can be fermented separately, as each set of leaves from different parts of the plant require different treatment in the subsequent fermentation.

If the soil is rich and the season favorable, a second profitable crop can be produced from the suckers. The first suckers, of course, should be broken off from time to time; otherwise they will sap, hinder, and check the growth of the leaves. When all of the leaves have been primed from the original stalk except four or six leaves at the top, two suckers should be allowed to grow from the bottom of the stalk. These will be well started by the time the top leaves of the original stalk are ripe. The stalk should then be cut just above where the suckers sprout, and cultivation should begin at once by carefully placing soil up around the old stubble. The suckers should not be allowed to have more than six or seven leaves each. The growth of these will be rapid and they will mature early. Usually these are not primed, but the stalks should be cut.

In northern Luzon these mature in about three weeks and, in years of great humidity, a second crop of suckers is allowed to grow.

After harvesting the tobacco is carried to the sheds for drying and curing. These sheds are usually large enough to hold the crop from a number of small fields. Many different kinds of drying sheds are used, and differences of opinion prevail as to the relative merits of each style of shed. Some are broad and flat, others narrow and tall. The broad, flat type of barn is to be preferred, for the tobacco cures more slowly and better results are obtained. The interior of the shed is so constructed that frequent tiers of rafters and posts allow ample support for hanging the tobacco. The doors and windows should be with the idea of giving very thorough ventilation when open. The manipulation of the barn or curing shed is entirely governed by the condition of the weather and the nature of the tobacco, and no fixed rules can be given. Considerable care and judgment must be exercised in the curing of the crop, and as the conditions vary in each case from year to year, only experience can determine just what is to be done to meet the new problem in the curing shed. The process requires a few weeks, especially if the leaves have been primed. The crop is considered thoroughly cured when the midribs of the leaves are cured; it is then ready to be taken to the packing house for sorting, fermenting, and baling.

Very much of the value of tobacco depends upon the infinite care that is taken throughout the whole period of its production, and thorough consideration of all the details should be shown in the fermentation, grading, and sorting. The fermentation has two purposes. The first is to insure the proper texture, glossy appearance, and color to the leaf. It brings out the characteristic properties of the leaf, which are hardly apparent when the leaf is cut in the field. It is, furthermore, necessary to press the tobacco into bales, so that it can be shipped in compact form. The best results are obtained when bulk fermentation is practiced. In this method the leaves are assorted into piles, depending on what part of the stalk they have been taken from. Layer after layer of leaves are placed together, until piles of more than 1 meter are reached. The temperature in the pile gradually rises, and frequently thermometers are inserted to determine the exact degree of heat, which is never allowed to become excessive, or the tobacco will be injured. The piles are frequently turned over, to secure the proper heat and regulate the fermentation. No statement can be made as to how often the piles should be turned over, or when this should be done, as it depends upon the condition of the tobacco, especially as to how moist it was when placed in the pile. The leaves from the upper part of the stalk must be fermented more slowly than the lower leaves; consequently, the piles must be torn down and rebuilt more often. The principal fermentation is one before the sorting, as after the sorting there are so many grades which have to be kept separate. Often these different grades are re-fermented to improve the quality of the leaf.

In the Cagayan Valley the tobacco is placed into packs of 4 bundles of from 20 to 40 leaves. These bundles are then placed into bales of 80 packs. From 1 hectare an average yield for a number of years is 612 kilos of dry leaves. The tobacco is frequently assorted, with the following results: From 1 hectare, 10 packs of superior tobacco, 30 packs of first-class, 40 packs of second-class, 80 packs of third-class, 160 packs of fourth-class, and a number of packs of fifth-class tobacco. The sorting is generally carried on with reference to the colors, absence or presence of spots, length and soundness of leaf. Many divisions and subdivisions are made, according to market demands and the intended use of the tobacco. After the work of sorting and grading has been completed, it is baled into compact bales, when it is ready for shipment.

GROWING TOBACCO UNDER SHADE.

The growing of crops under shade is not a new idea, but was practiced perhaps hundreds of years ago; but the cultivation of fields of tobacco under a light cloth shelter of some character is comparatively recent. The idea of using shade started in the United States, in Florida, where in the last few years tobacco cultivation has made enormous advances. It was noticed that in new land, only partially cleared of the forest growth, the plants grown under the scattered trees were far superior to plants not so shaded. From this the idea of artificial shade had its birth, and now large fields, nearly 5 hectares in size, are grown under shade with great success.

In addition to the experiments in Florida, many trials have been made in the State of Connecticut, with equal success. The character and quality of the tobacco was considerably modified and profits greatly increased. It was determined that tobacco fully equal to the finest Sumatra leaf could be grown in the Connecticut Valley on a commercial scale, and the experiments received widespread attention, and large companies have been formed to grow tobacco exclusively under shade. By using the shade the damage from insect pests is reduced to a minimum, the moisture content of the soils is increased, while the evaporation from the leaves is largely retained, favoring a more rapid and luxurious growth. The shelter tempers to some extent the intense heat of the sun and at the same time readily allows the free passage of even the slightest showers through it.

In figure 2^a is shown the general appearance of a tobacco field covered with a cheese-cloth shelter. The field contains about 4½ hectares and is one of a number of large fields of shaded tobacco grown in Florida in 1899. In figure 3^a is shown the details of the outside structure of the framework before the covering was put on. In figure 4^a is shown the details of the framework of a shade that was used in the Connecticut Valley in 1901. A strong framework is constructed of posts and stringers, that is further strengthened by strong wires secured at each end of the field by strong stakes driven well into the ground. This is covered with some light cloth, such as cheese cloth. By special request, an extra wide (about 5 meters) quality of cloth was made for the season of 1902. The cloth completely covers the framework and reaches to the ground, where it is secured. Gates are provided, covered with cloth, and, in the fields of large dimensions, it is advisable to leave a road lengthwise through the field. Usually the cloth must be renewed each season, but the framework is built sufficiently strong to last four or five years. The height of the framework is about 3 meters and the average total cost of the shade in the United States is about \$350 United States currency, for 1 acre, 0.4 hectare. In the Philippines such a shelter could be constructed much more cheaply, on account of the cheapness of the framework, for bamboo and bejuco could be substituted largely for hard-wood posts and wire.

The covering completely incloses the field, and should be made so close that few, if any, insects can enter. The protection from strong winds is very beneficial, as the leaves are often torn and lashed when the crop is not protected. Much protection is also afforded from heavy, dashing rains, which would otherwise damage the leaves. The force of the heavy rainfall is broken and frequently the crop is saved when, without protection, it would be badly torn and damaged. So much better results have been accomplished in the United States with the shade-grown tobacco that an earnest plea is made for its introduction into the tobacco districts in the Philippines. Rumors have stated that the attempt is to be made in the Cagayan Valley, but the author can not state how far these experiments have been conducted, or what success has been attained. It will, of course, be advisable to experiment on a small scale, rather than expend any considerable amount of money on materials for shading large fields. A shade of sufficient size should be constructed to determine to what extent the crop will be benefited, and then plans can be made for the erection of larger coverings.

CONCLUSIONS.

From the above it is at once apparent that the successful cultivation of tobacco requires the greatest care and attention, from the preparation of the seed bed to the final fermentation and baling of the ripened leaves. While anyone unfamiliar with tobacco culture can probably produce a crop, it is to be doubted if it will be of such a character as to command a good price. Judgment, only to be gained through experience in growing the crop, is necessary at so many stages of the growth of the plant that it is doubtful if it is profitable for the planter to undertake its cultivation unless he can engage the services of some one who has had such experience. And yet it is possible for the careful planter, who persistently studies the requirements of the crop, in a very few years to produce tobacco of a quality superior to that grown in regions where its cultivation has been practiced for scores of years. When the Department of Agriculture attempted growing Sumatra tobacco under shade in the Connecticut Valley the idea was greatly ridiculed by conservative New England planters, who scoffed at the idea of trying to grow a new kind of tobacco. They main-

^a These figures are on file in the Bureau of Insular Affairs, War Department.

tained they had grown tobacco for years and knew the limitations of the soils and climate and the kind of tobacco best suited to the conditions. It took only one year to convince them that a new type of tobacco could be grown and sold for prices many times in advance of the best prices ever obtained for the finest of the old standard crop. And this has been the experience of tobacco cultivation the world over. Experiments have been tried in tobacco growing in new areas and in a few years, in many cases, have entirely revolutionized the agriculture in certain districts. New areas are constantly being opened up, with results that are very gratifying, even to the most sanguine experimenters.

In the districts where tobacco cultivation has been carried on for years no one should be contented with the results obtained, but should, by constant experimentation with new seed and improved cultivation, endeavor to improve the quality of the crop. Here in the Philippines it is commonly stated that the tobacco grown to-day is inferior to that formerly grown. This is greatly to be regretted, and it should be the especial effort of every planter to produce tobacco not only equal to that grown a few years ago, but far superior to the finest crops that were ever harvested. The tobacco markets of the world willingly pay, and pay well, too, for tobacco of a superior quality, whether it is to be used for cigars, cigarettes, or manufacturing purposes. The trade does not pay well for common tobacco, for anyone can grow coarse, common tobacco of low grade. The quality of the tobacco must be superior to that formerly grown to command a good price, for tobacco consumers are becoming more fastidious and constantly demand better goods for their money.

The author is of the opinion that the Philippine Islands can and should produce cigar-filler tobacco that is fully equal to the finest product of the famous Vuelta Abajo district of Cuba and a cigar wrapper equal to Sumatra tobacco. With careful attention to soil and climatic conditions, it is believed districts can be found that will raise tobacco similar in flavor and aroma to that grown in the best districts of Turkey. These results can only be obtained, however, by persistent, intelligent, well-directed efforts on the part of the planter.

Philippine tobacco to-day does not occupy the position it should, and every planter or company engaged in its cultivation should strive to place it on the high standard it deserves.

APPENDIX R.

REPORT BY INTERNAL-REVENUE AGENT BROWN ON THE TOBACCO SITUATION IN THE PROVINCES OF CAGAYAN AND ISABELA.

Manufacturers of cigars in these islands, dealers in the islands in native leaf tobacco, consumers in the islands of Manila cigars, manufacturers and merchants abroad who have handled in past years Philippine tobacco, consumers abroad of Manila cigars, and the Filipino, whether grower or tobacco merchant, all are of one mind on the tobacco situation. Philippine tobacco has gradually sunk to a deplorable level. Reports come from all sides that a Manila cigar is no longer the peer of the celebrated article produced in Cuba, the Habana cigar, and the tobacco of the Philippine Islands, which used to be prized all over the world, is now accepted with suspicion or in some cases is looked upon with indifference. Nature has most bountifully favored this country with rich and fertile lands and has given her products—hemp and tobacco—a high and distinguished place in the markets of the world. Hemp still stands in its high place, but the fragrant, fine, high-grade Philippine tobacco seems to be near the point of being termed a thing of the past. It is at low ebb, staggering and about to fall, and a report to-day on the situation should deal only with the causes which have led up to the lamentable state of affairs and what seems to be a remedy.

Tobacco is grown on both sides of the Rio Grande, and the lands cultivated begin at Alcalá, Cagayan, and extend to Echague in the province of Isabela. This stretch of land varies in width from a few miles to perhaps 10 miles. It is not considered to be profitable to cultivate tobacco farther north than the point Alcalá, as the effect of the sea breeze is felt. There is a small quantity, however, raised at Gattaran, but it is put to local uses solely. The farther south tobacco is grown the better its quality.

The tobacco lands of Cagayan are owned almost wholly by natives of the province, and in Isabela the area owned by them greatly exceeds that in the

hands of Europeans. All of the lands owned by whites are situated in the province of Isabela, the *Compañía General de Tabacos de Filipinas* being the largest holder. The fact that the native owns the greater part of the tobacco land is an important one and bears on the situation directly.

The area of the lowlands, lands which are yearly flooded, on which tobacco is grown, greatly exceeds that of the highlands, or lands which border on those which are under water during the inundations. The lowlands which are so richly and generously replenished by nature through the floods produce the best tobacco and the native grower who cultivates tobacco on those lands starts off every season with all in his favor. On the highlands the European planters get good, first-class tobacco, but this the native rarely can obtain. The highlands by some planters are stripped bare of all timber, while other planters prefer to leave clusters of trees here and there throughout the plantation. The tobacco is a grateful plant and responds to every attention and the additional moisture brought to it by natural means as in the plantations in which trees are left standing shows itself in a slightly better quality of tobacco than that received from the land kept clean of everything. In virgin lands it is the custom to grow tobacco on one part one year, the following year on the next adjacent part, the third year on a more distant division, and on the fourth year again planting on the first part. Allowing the soil to rest and recuperate in this way, tobacco as fine in quality as that grown on the lowlands is obtained.

As the greater part of the tobacco area of Cagayan and Isabela is lowland its value for the cultivation of tobacco is to-day equal to what it was in the past.

In sowing tobacco in seed beds a fair amount of care is exercised by the native grower and in transplanting some attention is bestowed, but after that point the plant does not receive the treatment it needs. Weeding, freeing of the plant from the bug which will thrive on it if left alone, and other attention, are all done in a thoughtless and careless manner.

In place of harvesting his tobacco when the leaf is neither too green nor too ripe, the native grower cuts his plant without regard to the rules that were observed by his forefathers and which are bred in his bones. He simply cuts or gathers whenever it suits him, knowing that he can sell.

In the preparation and classification, of the leaf the fancies of the native grower about the sale of his crop crowd out of his mind all thoughts about quality. In this respect he is free of care and worries not. It has been claimed that if the fermentation of the leaf is well and properly done it will result in a fine texture and general good appearing tobacco, but white growers assert that tobacco neglected in the fields can not by any process of fermentation be made to appear the same as the well-cared-for plant. Tobacco from the time of planting to the time it is put up in bales needs great care. In Cagayan and Isabela this is denied the plant by the native grower and the result is that all are forced to admit that Philippine tobacco is slowly and steadily falling in the estimation of those who for years have prized it. By their careless and neglectful methods of cultivation of tobacco in Cagayan and Isabela the natives are simply taking the bread out of their own mouths.

The transportation of tobacco from the farms to the warehouses of the buyers is to-day carried on in the same way as it was carried on in the days of the government monopoly, by carabao carts or by sledges. Before and after 1882 the growers at their expense made delivery to the buyer, but in late years this expense has been borne by the buyers. There is not much complaint of lack of roads, but of course good country roads all through the tobacco country would be a benefit both to the grower and buyer. Taking a bird's-eye view of the Cagayan Valley, one sees dotted near the banks of the Rio Grande, all the way up from Alcala, the storage warehouses of the tobacco buyers. The representatives of the Manila dealers in charge of these employ native "aforadores" on commission to buy for them, and out of the commission the "aforadores" provide transportation to the warehouse of the tobacco bought. Transportation facilities on the Rio Grande after the tobacco buying, August to December, are fairly good. The river is high at that season of the year, and large cascoes and barges are easily navigated. As Cagayan and Isabela tobacco goes through a curing process at Manila and is stored four or five years sometimes before being used in the factories, time is not a very important factor in the question of transportation of tobacco in the provinces where it is grown. From Alcala to Tuguegarao there is a fine, well-built road, and over every stream or gully a strong, well-constructed bridge has been put up.

The following prices are paid for the transportation of tobacco on the Rio Grande in the provinces of Cagayan and Isabela:

Echague to Ilagan, about ₱0.80 per quintal; Ilagan to Aparri, about ₱0.53 per quintal; Tuguegarao to Aparri, about ₱0.40 per quintal, and by steamer from Aparri to Manila, about ₱0.35 per quintal.

It is not believed that the transportation facilities affect tobacco very greatly. Under the Spanish Government as much as 4 pesos were paid for the shipment of one bale from Aparri to Manila. Transportation is not the cause of the trouble.

The real causes of the situation should be laid at the doors of the native growers and the Chinese dealers in tobacco. The native at one time used to care for tobacco well and produced an article of good quality; to-day he is able to cultivate it as well as before, but does not do it. Up to 1882 the Filipino planters of Cagayan and Isabela grew tobacco at the muzzle of a gun. Every family was under the orders and supervision of a government employee, and the worker who disregarded the rules laid down for operations in the fields generally had administered to him a few smarting cuts with a bejuco. This slave driving resulted in first-class tobacco. The harsh restriction under which the native had cultivated tobacco having been withdrawn in 1882, the government monopoly no longer existing, notable reaction set in. From that date till to-day the methods which have been adopted and the results which have been obtained by the Filipino tobacco grower have been gradually sinking to a low standard. In 1900 the keen competition and the rush for the crops of Isabela and Cagayan and the high prices paid the planters have caused them to argue with themselves that it pays better to grow tobacco without regard to the best methods. From 1883 up to the present time there has been no restriction on the grower; he has been free in his fields, and the inferior quality of his product is the result. It has been shown that from the time of sowing seed he has been careless and neglectful, and therefore to the Filipino planter must be attributed the present state of affairs.

However, before leaving the part played by the native it should be stated that to produce better tobacco he must work hard, very hard, in his fields with his crop, and from the time of sowing in seed beds he must be unceasing in his attentions. Considering the enervating climate, the fact that tobacco raising requires the efforts of the planter for more than half the year, that the native thinks but little of to-morrow, it is not to be wondered at that he has preferred to let things swing their own way.

The other cause or evil of the situation is found in the Chinese merchant who deals in leaf tobacco. The Chinaman is one of the best business men in the world—the world admits that. The natives of the Philippines like dealing with the Chino. Amongst the semibarbarous Moros of Mindanao the Chino is found driving bargains, buying and selling. The Chinaman panders to the native and to attain his object in business is often groveling. He plays upon the native and feeds the native's craving for money, and if he is allowed to continue as he is doing in Cagayan and Isabela he will probably cripple in a dangerous and serious way the native planters as a body. The Chinese merchant handles tobacco simply as an article of commerce. It is true many of them know good tobacco, but their one object is money. If ₱5 profit can not be made by them on a bale, then 5 cents will suffice. In buying, the Chino visits the ranchos and offers money or merchandise for any class of tobacco, and if not ripe he will buy the leaf as it stands in the fields. Every year these Chinos get more native growers in their clutches, and that this is a real danger to the reputation of Cagayan and Isabela tobacco all agree. Among all the white buyers in the valley representing the Manila houses there is harmony, and competition can scarcely be said to exist. All have one object in view—to buy for their superiors in Manila good tobacco, paying therefor a good price. By all of these Europeans bad tobacco is rejected, but this plan is not adopted by the Chino. All is grist that comes to his mill. Tobacco good or bad to him means money. It can not be said that the Chino as a merchant is one who wishes something for nothing. His methods are in a business sense legitimate, but in another broader sense his operations are not fair. He himself produces no tobacco and is hurting greatly those who do produce.

The two causes, then, of the depreciated quality of Cagayan and Isabela tobacco, in the opinion of the undersigned, are the native grower, his slothfulness and callous indifference, and the Chinese merchant by his hoggish buying methods. If allowed to go hand in hand much longer, these two will prove a disease to the whole industry.

To uplift the native grower it will not do to adopt harsh methods. Newspapers or other printed matter will not produce the desired results. The native respects authority, and subordinate officials in the provinces unless supported strongly by their superiors find difficulty in discharging important duties and achieving results, and it is respectfully suggested that the provincial governors be instructed to educate the native planters and that the provincial governors receive their direction and instructions from the honorable governor-general. In submitting this suggestion it is respectfully stated that in the middle of June, while passing through the tobacco country, it was specially noted that the feeling among the growers at Alcalá, Amulung, and Igul concerning the delay in the opening up of the buying of this season's crop by the large buyers of Manila almost approached alarm. This feeling was by no means openly displayed; the native, we well know, is stoical; but to one who understands his nature and who observes him on all occasions there was no doubt of the workings of his mind in this matter. This is a significant point. An American seeking information or light on a subject of high importance to the welfare of the Filipino from the native himself is not very successful; here is when the interest of a native provincial governor can be aroused.

The Manila manufacturers and dealers in leaf tobacco have united and agreed unanimously to reject all tobacco offered for sale by the growers which is not classified, and have agreed upon a tariff of prices. This is a step in the right direction and should bring the native growers to their senses and also should tend to counteract the methods of the Chinese dealer. The provisions of the internal-revenue law which require dealers in leaf tobacco to keep a proper record of their transactions are being enforced in Cayanag.

The efforts of all the white planters in the Cayanag Valley to improve the quality of tobacco are confined wholly to their own plantations. Under competent supervision tobacco is well cared for. They have confined themselves chiefly to discussions, to talks, and sympathizing one with the other; but lately prominent gentlemen of Manila, manufacturers, have put their heads together, and have resolved to reach the native growers with good sound advice and instruction on the culture of tobacco. As the tobacco lands are in greater part in the hands of natives, these exertions are praiseworthy. This fact of the greater part of the lands being in the hands of the native is also an argument in favor of steps being taken by the government through the provincial governors.

Before concluding this report it is deemed of importance to call attention to the demand which is growing all over the world for a light-colored cigar. The tobacco of the Philippines, grown in the open, is not suitable for light-colored cigars, but this should not be considered as a danger. The light-colored leaf is one which has been cut before it is ripe, and which has not been well cured. Sumatra is supplying this fine, silky, light-colored leaf, and is a competitor of the Philippines; but the supply is far short of the demand, and the press of the United States have undertaken to educate the smoker on this point. The Tobacco Leaf published the following on March 8, 1905, and again in May it was republished in the columns of the same paper:

"Probably there is not one smoker in a thousand who would not be surprised and in fact incredulous if he were told that the color of a cigar is absolutely no guide to its strength. Yet such is the case, and a fact well known to cigar manufacturers and importers. The belief of smokers that cigars of a dark color are strong and those of a lighter shade are milder is, in point of fact, as fallacious as it is general. This is but one of the many delusions harbored by consumers of tobacco, and which practical cigar men have smiled at and indulged from time immemorial.

"But of recent years the inclination of smokers toward light-hued cigars has assumed the proportions of a 'craze,' and the producers are finding much difficulty in meeting the demand. The manufacturers and Cuban raisers would now gladly correct their own error; but, after having carefully classified their products under the style of claros, colorados, maduros, etc., for decades, they find it next to impossible to dispel the illusion.

"A maker of Habana cigars uses but one grade or blend of tobacco in the body or filler of his cigars. Exactly the same stock is used in his conchas as in his perfectos; in his claros as in his maduros. After the cigars are made, however, his 'selector' takes them in hand and classifies them according to the relative shades of the wrappers. This is done to effect uniformity in the appearance of each box of cigars, and to enable the dealer to readily indulge the whims of the self-deluded smoker.

"Inasmuch as the wrapper constitutes not more than one-tenth of the cigar, it will readily be seen that the degree of its strength or mildness is very inconsiderable in effect. In this connection, however, it is interesting to note that tobacco tradesmen versed in the intricacies of the industry rigidly bar the light-colored wrapper from their own smoking tables, knowing that it generally indicates that the leaf was prematurely cut and improperly cured, and that it impairs the flavor and burn of the cigar. Cubans, who, by the way, are notably partial to mild tobacco, avoid smoking light-colored cigars just as they avoid eating a green orange or an unripe banana.

"The prejudice of these natives or tobacco tradesmen is a logical one, and serves to throw into bold relief a peculiar misconception of facts, which is both amusing and embarrassing to vendors of the fragrant weed.

"Whether cigar smokers will ever awaken to the fact that a dark cigar is, if anything, milder and invariably sweeter and more aromatic than a light cigar, remains to be seen."

However, light-colored leaf can be grown in the Philippines and is grown yearly in small quantities on the estate in the province of Isabela of one of the large Manila manufacturers by the shade culture process. The structure used in the plantation referred to is 3 meters in height and a covering of strong, fine canvas is used in place of cheese cloth or "coco crudo." Cheese cloth is not strong enough and the sun's rays penetrate, and "coco crudo" is not strong enough to resist the rain and wind storms.

The growing of tobacco under shade in the Philippines is expensive, and no attempt is made to produce large quantities. To produce 300 pounds costs ₱500, and the duty on 300 pounds in the United States amounts to ₱850. These expenses, put against the price being paid for fine, light-colored leaf in the United States, mean that shade-grown tobacco for export to America can not be cultivated with profit in the Philippine Islands.

APPENDIX S.

REPORT BY INTERNAL-REVENUE AGENT HOPE ON THE SALE OF LEAF TOBACCO AND THE MANUFACTURE OF CIGARS, CIGARETTES, SMOKING AND CHEWING TOBACCO, AND CHINESE SMOKING TOBACCO IN THE CITY OF MANILA.

LEAF-TOBACCO DEALERS.

The dealers in leaf tobacco are divided into two classes, i. e., the wholesale dealers and the wholesale and retail dealers, there being 8 of the former and 27 of the latter.

The wholesale dealers receive their tobacco direct from the growers in the provinces, principally of Isabela and Cagayan, and have large bodegas located close to the river and canals of the city where cascos can be seen discharging their cargoes all the year round. Some of these dealers have from 2 to 6 bodegas, containing from 500 to 1,000 bales of leaf tobacco, which, with their customary trade, is stock enough to last from four to five years in case of an emergency.

The tobacco in all cases comes in bales called "bultos," the exterior being wrapped in dry cocoanut leaves and bound with rattan under heavy pressure. Considerable care is taken in the packing of this tobacco, which is done by Filipinos and Chinese, that packed by the Filipinos being distinguishable by its superiority, the leaves of which are spread out or arranged in plaits and stacked uniformly, and the bultos noted for their solidity. The same care is not taken by the Chinese in packing this tobacco, and as a consequence their bales are one-third and sometimes one-half as light as those packed by Filipinos, although the dimensions are the same.

The purchase of the higher grades of this tobacco is sometimes by the number of leaves of uniform size, but usually by the weight; the lower grades of this tobacco are sometimes purchased by the uniform size of the bultos, and whether packed by Filipinos or Chinese.

The tobacco when packed in the provinces is generally in a half-seasoned condition, partly damp, and it is for this reason, together with the fact that the longer it is kept the better and more flavored it becomes and increases correspondingly in value, that it is stored for long periods by dealers in their bodegas.

On these bultos may be seen various marks denoting the province from which the tobacco was purchased, the class, and sometimes the weight, and the marks of the firms handling it, all of which are noted on the shipping invoice.

The average weight of these bultos is from 1 to 2½ quintals, and are arranged in classes as follows:

Isabela Province.

	Per quintal.
First class, sold in city for-----	₱27.00 to ₱24.00
Second class, sold in city for-----	20.50 to 17.50
Third class, sold in city for-----	15.50 to 13.50
Fourth class (superior), sold in city for-----	12.50 to 10.50
Fourth class (corriente), sold in city for-----	8.00 to 7.00

Cagayan Province.

First class, sold in city for-----	₱20.00 to ₱17.00
Second class, sold in city for-----	15.00 to 12.50
Third class, sold in city for-----	12.00 to 10.00
Fourth class (superior), sold in city for-----	10.00 to 8.00
Fourth class (corriente), sold in city for-----	7.00 to 6.00

La Union Province.

First class, sold in city for-----	₱12.00 to ₱9.00
Second class, sold in city for-----	10.00 to 7.00
Third class, sold in city for-----	8.00 to 5.00
Fourth class, sold in city for-----	4.00 to 3.00

Barili, Cebu Province.

First class, sold in city for-----	₱12.00 to ₱10.00
Second class, sold in city for-----	10.00 to 8.00
Third class, sold in city for-----	8.00 to 7.00

There are other provinces that produce tobacco but of an inferior quality and which sells at a very low price, but, nevertheless, has a fair sale in the city, being used chiefly by mixing with higher grades.

Some of the larger cigar and cigarette factories are supplied by these wholesale dealers in leaf tobacco. Sometimes the tobacco changes hands two or three times among the retail dealers, and nearly all of them will sell any quantity from one-half a kilo up to any number of quintals, and invariably supply all the smaller factories.

In this industry, like many others in which the Chinese are interested, there are many schemes, those most favored by the retail dealers being to take the center out of a bulto and replace it with an inferior class of tobacco, or to remove two or more leaves out of each bulto and make up the weight with extra dry cocoanut leaves plaited in with the exterior cover. In some cases this is made impossible by having the bulto opened and every leaf examined, refusing to accept all doubtful and broken ones. In such cases, however, the Chinaman proceeds to make up for such vigilance on the part of the buyer by placing this refuse in the center of some other bulto and palming it off on some one who does not take the trouble to examine it.

As a class, these dealers are able to do a fair business and clear a profit of from 7 to 12 per cent, not including their schemes.

THE MANUFACTURE OF CIGARS.

Out of the 58 factories doing business in the city of Manila, 14 are owned by Europeans, 1 by an American negro, 24 by Filipinos, and 19 by Chinese. With the exception of one, who is solely an exporter, all make and sell cigars for local consumption in addition to what some of them export. All cigars made by these factories are from the Philippine leaf.

The leaf most used, especially for the higher grades of cigars, is that grown in the provinces of Cagayan and Isabela, of the first class, while that most used for the intermediate grade of cigars is that grown in the provinces of Cagayan and Isabela of the second and third class, and that most used for the low grade of cigars is sometimes a blend of the tobacco grown in the provinces of Cagayan and Isabela of the fourth class, together with tobacco from other

provinces. Of course the value of the cigars manufactured varies according to the class of tobacco used and workmanship, the first class ranging in price from ₱50 to ₱250 per thousand, seldom higher; the second class from ₱20 to ₱50 per thousand, and the third class from ₱10 to ₱20 per thousand.

Some manufacturers claim that no two crops of tobacco yield the same quality, and that only one crop in four yields a superior quality of tobacco, and that in recent years the quality has decreased. However, notwithstanding all these drawbacks, there is always a good market for these crops, which are eagerly sought for.

The percentage of tobacco used for wrappers and filling varies with each class. A conservative estimate for high-grade wrappers would be from 8 to 12 per cent, with the next grade from 12 to 20 per cent, and with some factories up to 25 per cent. This would include all first-class tobacco. Fillings for this class run from 60 to 70 per cent. Second-class wrappers average from 15 to 20 per cent, and fillings from 35 to 45 per cent. Third-class wrappers average about 10 per cent, and fillings about 15 per cent. From the last two classes of tobacco most of the lower grades of cigars are made. In many cases the fourth-class tobacco is mixed with other tobacco, usually Londres and Nueva Habana of inferior grade, and is handled mostly by the smaller factories.

The actual waste of a cigar factory, i. e., the stems of the leaves, is approximately 22 per cent; the cuttings of large factories are either sold for exportation to Hongkong and Shanghai, or to cigarette manufacturers, who are always ready to buy them. In the case of smaller cigar factories these cuttings are broken up and used over again.

The tobacco stems are sold to some Chinamen for a very small sum, in fact many factories are only too glad to have them taken away for nothing. These stems are used by the Chinamen in making a wash for polishing furniture and marble by burning the stems in a furnace especially provided for that purpose, and the ashes placed in large earthen filters. A certain amount of water is then added, which, when it has passed through the filters, is immediately caught in barrels underneath, placed in boilers and allowed to boil slowly for a day or two, after which it is considered ready for use, packed in coal-oil cans and sold for ₱2 per can.

Manila does not possess a single cigar machine, although some time back one of the larger factories bought two of European design for experimental purposes. The result, however, proved so poor that the idea was abandoned, the machines dismantled, and portions used for other purposes. All the cigars in the city of Manila are Filipino handmade, which gives employment to many thousands, both male and female, ranging from 10 to 60 years of age. Many manufacturers differ in opinion as to which of the sexes is more satisfactory in the manufacture of cigars, but if there is any preference it rests with the males.

The average factory working day is from ten to twelve hours, excepting Sundays and holidays, when, if work is done, the pay is doubled.

The cigar workers are arranged in classes for the preparation of the leaf, such as stripping, etc., which is always done by hand, cutting wrappers to uniform size and stacking them ready for work. One section can be seen with piles of tobacco leaf in front of them, cut to about the size of a silver peso, rolling cigars, others putting on tin foil, packing in boxes and pasting on labels, etc. These workers are paid by the piece. A good cigar maker of high-grade cigars can make from 100 to 150 per day, of low-grade cigars from 150 to 300 per day, and an exceptionally good cigar maker can make 350 cigars per day. There are very few, however, that can make 350 cigars per day. The pay of these workers averages from ₱5 to ₱18 per thousand. The best cigar maker seldom exceeds the latter amount.

The comparatively small stock kept on hand by most of the small factories is due to the worm which attacks the cigar after its manufacture. In some cases the cigar is attacked by this worm within three months after its manufacture, and in other cases seems to escape up until nine months, but seldom escapes beyond that period.

The cigar boxes used by the factories are either secured locally or imported, only one factory possessing a machine for their manufacture. All local purchases are made from Chinos, who make them by hand and sell them for from ₱14 to ₱18 per thousand boxes. Some manufacturers claim that the imported box from Germany can be secured for about half the local price after paying all expenses of importation.

THE MANUFACTURE OF CIGARETTES.

There are 50 cigarette factories in the city of Manila, 11 of which are owned by Europeans, 14 by Filipinos, and 25 by Chinese. Twenty-eight of these factories have their own cutting machines, and all, with the exception of 7, have their own cigarette machines.

There are two classes of cigarettes, machine and handmade, the former predominating. The tobacco used includes all classes and the classes mixed very with every factory, in some instances being considered as a secret.

The following is the formula used for one mixture:

	Kilos.
Fourth-class tobacco, Isabela Province.....	322
Fourth-class tobacco, Cagayan Province.....	115
First-class tobacco, La Union Province.....	139
Second-class tobacco, La Union Province.....	138
Third-class tobacco, La Union Province.....	138
First-class tobacco, Barill, Cebu Province.....	92
Second-class tobacco, Barill, Cebu Province.....	69
Total.....	1,012

Even this mixture of low-class tobacco is able to command a fair market and sells from ₱40 to ₱45 per thousand packages (cajetillas) of 30 cigarettes to each package. The selling price of the factories for cigarettes made of the above-sized cajetillas is from ₱39 to ₱76 per thousand packages.

There is very little preparation required for tobacco which is to be cut for cigarettes. The stems of the leaves are seldom separated but are chopped up with the tobacco. The tobacco is taken from the bulto in piles ranging from 20 to 30 leaves at a time, the stems of which are dipped in water to about 6 inches and thrown aside for a day or so. This allows the whole leaf to moisten, which prevents its going into powder when thrown into the cutting machine, which would happen were it cut in its dry, crisp state.

The machines used for cutting this tobacco in this city are mostly of French pattern, with either steam or electric power, and cut at the rate of 380 kilos per hour. This tobacco when cut is called "picadura."

The picadura, before being made into cigarettes, has to be thoroughly dried and cleaned. The drying is in most cases done on the roofs of the factories, or any open space where it will have the benefit of the rays of the sun. With some of the larger factories this drying is done by machinery. The tobacco is then cleaned, sometimes by steam power, but mostly by hand, which is a process of separating the fine powder or dust from the tobacco, which is then ready for use.

There are three classes of cigarette machines, i. e., "La Favorita" and "Usines Decueffe," both French machines, and "The Bunsach," an American machine. "La Favorita," although the slowest one of the three, is the one most used. In working this machine one hand is required to arrange the picadura regularly in the feeder, which holds usually about 2 kilos of tobacco, and to lookout for the fouling of cigarette papers, which constantly happens. The papers used with this machine are fastened with paste or gum. The capacity is generally from 30 to 32 cigarettes per minute. This machine is adaptable for either steam, electricity, or hand power.

The "Usines Decueffe" machine is an improvement over the "La Favorita" in that it has a capacity of from 60 to 70 cigarettes per minute. There are two kinds of this machine, one which fastens the cigarette paper with either paste or gum and the other by a crimp. In other respects these machines are much the same as "La Favorita."

"The Bunsach" machine, like the French machines, requires but one attendant. The tobacco is thrown into the feeder, which is a large square box, sometimes tapering off at the bottom, in large quantities. This tobacco, in process, passes through the machine and comes out at the bottom rolled in a long continuous string and accompanied with the cigarette paper, which is run off from a reel, passes through another part of the machine which fastens the paper with a crimp and cuts off the cigarette at the rate of 250 per minute.

The advantage of the French machines over the American is that they tuck in one end of the cigarette, which is much desired. The disadvantages are that they can not, with safety, use up the coarse grains of tobacco which are usually sifted out from the long, stringy picadura in cleaning. Although there is always

a small proportion of these coarse grains that become mixed up with the tobacco or picadura, this, in the process of manufacture, generally falls through the machine and is caught in a vessel placed immediately under the machine for that purpose. There is still, however, one way by which these coarse grains can be used with these machines, although very few care to take advantage of it. When the long arm of the feeder is packed, these coarse grains may be sprinkled on the top, usually in the center, and thus carried into the manufacture of the cigarette. The one objection to this is that by tapping the cigarette with the open end held downward, or by pulling out one or two of the long stringy threads of picadura, half the contents of the cigarette will fall out and render the cigarette useless.

The advantage of the American machine is its ability to dispose of the smaller grains of tobacco, and its rapidity. These grains are mixed up with the picadura and thrown into the feeder and come out of the machine rolled firmly in the cigarette.

The percentage of the cigarettes that run foul with the French and American machines is from 10 to 15 per cent. These are called "desechos" and are broken up and reused.

Many of the factories have cigarettes made by hand in addition to those made by machine. In the former method a large proportion of the tobacco which is not used with the machine can be disposed of. These cigarettes are divided into two classes, one of which is made of the same class of tobacco as is used with the machines, having about 10 per cent of machine refuse mixed in, the paper fastened with paste, and, in some cases, having one end tucked in, but in most cases both ends left open. From 300 to 350 cigarettes of this class can be made by one person in an hour. The other class of handmade cigarettes is made of all coarse grain, usually all refuse tobacco from the machines. The paper in this class of cigarettes is not fastened, but left open, having both ends tucked in. These cigarettes are made at the rate of from 450 to 500 per hour. All handmade cigarettes are made exclusively by females.

The actual waste of tobacco in a cigarette factory depends on the sort of tobacco used. In the higher grades and with the wide leaf there is very little wasted; with the lower grades and smaller leaf there is more wasted. A great deal depends on the way the tobacco is handled—much transporting, repacking, etc., will naturally break the picadura up and turn it into powder. The loss of a cigarette factory is from 3 per cent and ought not to exceed 8 per cent. By the actual loss I mean the powder that has gone through the fine sieves—that which can not be used in the manufacture of any kind of cigarettes or smoking or chewing tobacco. This powder is sold to farmers for fertilizing purposes and insect killing, the only use it can be put to.

The manufacture of cigarettes, like the manufacture of cigars, employs some thousands of laborers, two-thirds of whom are females. Every factory has a workshop in which one or more machinists are employed, receiving salaries from \$50 to \$100 per month. The attendants at the cigarette machines are paid from \$0.70 to \$1 per day for day and night work, respectively. All the rest of the help are paid by piecework. The wrapping is mostly done by women, one person usually wrapping from 100 to 120 packages in an hour and is paid from \$0.50 to \$0.60 per 1,000 cajetillas. All labor on Sundays and holidays demand double pay, while night work demands an increase of one-third.

The working hours of most factories are unfixed, and all depends on what trade they do. Some of them are at work day and night, while others work from sixteen, twenty, to twenty-two hours daily.

The average number of cigarettes in 2 kilos of tobacco differs with many factories—from 700 to 900 with the large size and from 1,000 to 1,900 with the small size.

The keenest competition is always shown in this line of business; old firms and old brands in some cases don't figure much. I have known of some of the factories to be doing an increasing business month after month, then all at once the trade would fall away to almost half, sometimes less, and continue so for a time, when it would pick up again. This is the case with a majority of them, although the general business is steadily on the increase. No explanation for this can be given by any of them.

One complaint I often hear from these manufacturers is the practice of one manufacturer imitating the other's wrappers, as follows:

A's trade is bad; he finds that B's trade is exceptionally good on a certain brand of cigarettes which is selling for say \$50 per 1,000 cajetillas. A will have

his lithographer make him B's wrappers as nearly identical as possible without overstepping the law, if by chance B has his patent registered. A will then canvass the dealers, generally Chinos, and offer this imitation, which is usually inferior tobacco, for, say, ₱45 per 1,000 cajetillas. If the dealer accepts, which he rarely fails to do, he will await his "marks," who are principally provincial people who can not read, and when they ask for B's brand he will hand them A's imitation brand, charging the same price he would for B's genuine cigarettes. The customer, knowing the pictures on B's brand and being unable to read, accepts, and the dealer not only makes his usual profit of ₱1 on the 1,000, or the value of the wooden box in which the cigarettes came, which is in many cases the only profit made, but he will also make the difference in the factory price in addition to the ordinary profit, thereby ruining the reputation of B's cigarettes. For this reason some factories have affixed a notice on their original packages cautioning their customers to guard against this practice.

THE MANUFACTURE OF SMOKING TOBACCO.

The tobacco used for this purpose is prepared in the same manner as that used in the manufacture of cigarettes, with the exception that it is not thoroughly dried and is known commercially as "picadura."

The packages are usually made by hand and are put up mostly in rectangular shape, weighing 200, 250, and 500 grams.

The factory's price depends on the grade of tobacco used. The package weighing 250 grams is the one mostly used, and, on the whole, is made from a fairly good grade of tobacco. This tobacco is sold by the factories for from ₱18 to ₱20 per 100 packages and by the retailer for ₱0.20 per package.

The apparatus chiefly used for packing is a wooden box of the required size, built on a stool on which the worker sits straddle, having the paper folded to size with one end open. This is placed in the box and the tobacco pounded in with a maul. The tobacco being generally damp, and seldom weighed out, accounts for the slight difference in the weight of each package.

In this class of tobacco can be and is generally used all refuse from cigarette machines, which is usually a good class of tobacco. This is mixed to the proportion of one-third to one-fourth with the long, stringy, machine-cut tobacco. On account of the grade and refuse used it requires more cleaning and, as a consequence, has a larger per cent of waste than the cigarette factory, the same being from 10 to 20 per cent.

This industry has a good market in the city of Manila and is bought up principally by the poorer classes for cigarette making for their own consumption.

THE MANUFACTURE OF CHEWING TOBACCO.

Chewing tobacco is made from the best class of tobacco and, like in the manufacture of cigars, the stems are separated, which is the only waste.

The leaves of the tobacco for this purpose are heavily sprinkled with water, pounded out on a board, and rolled up into pieces something like cigars. These pieces, when completed, are so saturated with water that you can squeeze the juice out of them with the thumb and forefinger. They are considered usable so long as they keep moist, after which time they have to be remade. They are put up in packages either of 10 or 100 pieces, the former being mostly in use, and weighing 100 grams to the package, which is sold for ₱1.85 per kilo or 10 packages.

This tobacco is exclusively used by Filipinos, who chew it with betel nut.

Chewing tobacco, after the American style, is not made in this city.

THE MANUFACTURE OF CHINESE SMOKING TOBACCO.

There are nine of these factories in this city, eight of which manufacture from the Philippine and one from the imported leaf. The imported leaf is known as the red and the yellow leaf.

The process of manufacture is the same with all the leaves, which is as follows:

The tobacco is prepared in the same way as in the manufacture of cigars, the stems being the only portion wasted. The leaves are soaked in oil, folded, and stacked in layers. They are then placed in a machine, under heavy pressure, and the greater part of the oil squeezed out, which leaves the tobacco in a

solid block. This is allowed to stand for a day or so, when it is bound with ropes and is ready for cutting. This is done by a worker who straddles the block and shaves the tobacco off with a plane.

The imported leaf is usually mixed with the Philippine leaf, and when shaved off is of a yellow color, while that which is all from the Philippine leaf is of a dark brown color.

Considerable care is taken in the shaving off of this tobacco, which is done slowly and in small pieces, and neatly arranged in layers on small trays. It is then placed in an oven for drying out before it is wrapped into packages. That mixed with the Chinese leaf tobacco is put up into flat, square packages of 296 grams and is sold for ₱1.50 per package. The other is put up in various sized packages of 77, 83, and 175 grams, and is sold for 10, 15, and 25 centavos per package.

A considerable quantity of the Chinese tobacco is imported already manufactured and is almost identical in every respect with that made in this city. This tobacco is largely used in Manila and can be found on sale in every Chinese retail tobacco store.

APPENDIX T.

REPORT OF PROVINCIAL TREASURER GOODHART ON MANUFACTURE OF CIGARS, CIGARETTES, AND SMOKING AND CHEWING TOBACCO IN THE PROVINCE OF BULACÁN.

The records of this office show that the manufacturers of this province have been very prosperous under the present law; in fact, the production of cigarettes for 1905, taking the reports of the past five months as a basis of calculation, will exceed the output for 1904 by about 20,000,000 cigarettes. As per bonds and official statements of manufacturers, only 43,438,000 cigarettes were produced in 1904, while the production for 1905, taking the reports of the past five months as a basis of calculation, will reach 62,125,860.

The increase in the output of cigars has been still greater, that for 1904 being 22,300, while the computed output for 1905 is 141,118.

In 1904 2,880 kilos of smoking and chewing tobacco were manufactured. For 1905, calculating on the same basis, the output will be only 1,841 kilos, or a loss of over 1,000 kilos.

I have visited almost all the factories and talked with the owners concerning the internal-revenue law, and found them all agreeing that the demand for their products has been greatly increased, and of the opinion that the new law has been beneficial to the business.

In some cases the sales have been double, and in one factory are three times as great, notwithstanding the fact that they ask 4 centavos for a package of cigarettes formerly costing 2 centavos, and on which the tax is only 1½ centavos.

COFFEE IN THE PHILIPPINES.

[From Report of the Schurman Philippine Commission, 1900, vol. 3, p. 269.]

This valuable fruit was brought to the Philippine Archipelago by the Spanish missionaries toward the end of the eighteenth century, and was first cultivated in the province of Laguna. It was afterwards naturally propagated easily and rapidly by a little mammal (*Paradoxurus musanga* L.), which fed upon the berries. Afterwards its cultivation fell to the lowest ebb, in spite of premiums offered to cultivators. At the present time, due to the increased price of coffee and better facilities for exporting, its production has begun to increase.

Although there are many different species of the genus *Coffea*, but 4 constitute the coffee of commerce. They are—*Coffea arabica*, or common coffee; *Coffea racemosa*, or Peruvian coffee, very similar to the preceding; *Coffea laurina*, or African coffee, and *Coffea liberica*, or Liberian coffee, a more robust plant, which has larger leaves than the common coffee plant. Almost all of the varieties cultivated come from the first species, which is the one requiring most heat. In the Philippines the provinces producing most coffee are Batangas, Laguna, Tayabas, and Cavite in Luzon, and the districts of Cotabato and Misamis in Mindanao.

Coffee requires a climate whose average temperature ranges between 16° and 24° C., and therefore next to sugar cane is the plant requiring the greatest amount of heat. In localities having both heat and moisture its growth is stronger and more luxuriant, as is manifested in various ways. In very hot climates the coffee plant grows well but should have the shade of some other suitable tree, whereas in cooler climates it thrives best without this protection. The soil most suitable for its cultivation is that which is light and moist but not marshy. Reddish soils somewhat sandy, or black soils without too much clay, are suitable for its cultivation.

If the land is virgin soil it should be thoroughly cleared, plowed deeply two or three times, and then harrowed, and if old land, it should be well fertilized.

Planting can be carried on in various ways. The best are by means of hotbeds and by transplanting. These hotbeds or nurseries are made in well-shaded soil, which should be clean, well worked, and thoroughly fertilized. The seed should be ripe and fresh, and not taken from the fleshy covering. Transplanting is done when the plants have three or four roots, care being taken not to injure the delicate stem, although a part of the central root is cut off at the moment of transplanting. Plants which have reached a height of 40 or 50 centimeters may be used by cutting off the upper part of the stem and likewise the vertical root, stamping down the earth about them, and immediately watering. The ground where this transplanting is made should be previously prepared, holes being made in parallel lines running north and south and having a distance of 8 feet from each other. The land should afterwards be kept clean, and other trees should be planted for their shade. The tree usually employed in the Philippines for this purpose is called madre cacao (*Gadedupa pungam* Bl.), but there are many who advocate the use of the balibago (*Hibiscus tiliaceus* L.) as giving better protection to the plantations and being more productive. Experience demonstrates that the pruning of coffee trees prejudices the production, as the plant growing naturally with favorable rains produces at the end of six or seven years an average of 5 kilograms of berries for each one, while those which have been pruned do not produce one-fourth as much.

The gathering is accomplished either by shaking, if the plants are high, or by hand picking, if they are low. After gathering, the pericarpium is removed, an operation easily accomplished by hand, and the berries are placed in the sun, care being taken to separate those collected on various days. When the berries are thoroughly dried the husk is removed by means of a mill or other apparatus. The other operations necessary to prepare coffee for the market are winnowing, to separate the inner husk and all dirt from the berry, and sorting into first and second grades.

The coffee plant begins to produce in from three to five years—according to climate, soil, and cultivation—is in full bearing in six or seven years, and continues to be productive for thirty years if no accident happens. Philippine coffee compares well with that of Java or Martinique, but there are certain localities which produce coffee which, according to experts, can be compared only to that of Mocha.

From former times the production of coffee in the Philippines has fallen off greatly, on account of the destruction of the plants by an insect of the genus *Xylotrechus* and by a fungus of the genus *Peronospora*.

[From report of the Secretary of the Interior to the Philippine Commission for the year ending August 31, 1902, p. 303.]

An especially fine coffee is grown in the mountain regions of Benguet and Bontoc and in the province of Lepanto. The bushes yield heavy crops, and the unhulled coffee at present sells readily at Manila at \$35 Mexican per cavan for consumption in these islands or for shipment to Spain. There is no region in the United States which has a more healthful or delightful climate than is afforded by the Benguet highlands, where a white man can perform heavy field labor without excessive fatigue or injury to his health.

[From report by Oswald A. Steven, Philippine Commission Report, November 1, 1902, p. 633.]

Coffee can be grown on most of the islands of the group where there are timbered gulches or ravines and up to an elevation of 2,000 feet. Coffee in these islands lately had a setback from a scale. The native grower "dropped it," but the manager of a modern farm will be able to rid himself of the scale, but must have the right location to grow the coffee.

After an education in this commodity, it is only a question of time when coffee can be a large export, for the soil, climate, and conditions are just suited to it. The most expensive part of the raising of coffee is the labor, and here in the Philippine Islands this item is reduced to a minimum.

The machinery required for the proper marketing of coffee is so simple and cheap that it figures very little in the expense, and even the poorer natives here could raise and market a choice coffee if shown how. The principal and most important part in the whole process is the grading or classing of the berry, but it is essential that high elevations be secured for best results.

[Extracts from the Report of the Philippine Commission, 1903, part 2, p. 50.]

EXPERIMENTS IN GROWING COFFEE.

As I have heretofore stated the coffee plantations of Batangas, which were formerly such a source of revenue to the inhabitants, have completely disappeared as a result of the ravages of borers and of the leaf blight. A tract of good coffee land in this province has been secured by the bureau of agriculture, which hopes to rehabilitate the coffee industry in Batangas, by demonstrating that immunity from disease and insect pests may be obtained by the selection of vigorous varieties of coffee and the adoption of the best systems of cultivation and treatment. Some time must elapse before the practical value of the experiments, which it is proposed to undertake, can be demonstrated.

[Page 644.]

COFFEE PLANTATION.

Through the public spirit of Señor Sixto Roxas, of Lipa, a tract of land about 10 acres has been secured for the use of the bureau for a term of years for the purpose of making experiments in the cultivation of coffee. Señor Roxas has agreed to provide the necessary unskilled labor for carrying on the work, which shall be under the immediate direction of an agent of this bureau familiar with coffee culture. Prior to 1891 there were in Batangas Province extensive coffee plantations, covering thousands of hectares of land, which yielded large incomes to their owners. Since that period the history of these plantations has been but a repetition of that of all coffee-growing countries in the Orient—almost total destruction by attacks of leaf blight and borers. The soil and other conditions of the province are undoubtedly unsurpassed for coffee

growing, as evidenced by the product of former years, and it is the purpose of this bureau to secure immunity from disease and insect pests by the selection of vigorous growing varieties and the adoption of the best system of cultivation and treatment.

[Report of William S. Lyon, in charge of division of plant industry, bureau of agriculture, in Report of the Philippine Commission for 1903, part 2, p. 700.]

DISEASE-RESISTANT COFFEE.

Particular interest attaches to an importation of new coffee seed into the islands, and the final outcome of the experimental plantings at Lipa, in Batangas Province, under the bureau's direct control, will probably have a strong bearing on the future of this great industry in the Philippines. The circumstances leading up to the inception of this planting enterprise were the outgrowth of petitions addressed to this bureau requesting that efforts be made to reestablish this once dominant industry, and, in conformity with the wishes of our correspondents, a careful inspection was made of the once largely planted central Batangas plateau, and, as offering conditions typical for a large area, a selection of trial grounds for coffee was made in the town of Lipa.

Through the public spirit and enterprise of Señor Sixto Roxas, of Lipa, a tract of about 10 acres was placed by him at the disposal of the bureau for a term of years, the tenure of which was to extend over the necessary duration of the experiment. The same gentleman has provided the unskilled labor to carry on necessary field operations, while the bureau's contribution to the same end covers seeds, tools, and general supervision and direction of the work.

It is unnecessary here to give more than a superficial sketch of the conditions which existed in south central Luzon prior to 1891. Until that time extensive coffee plantations, covering thousands of hectares of land, abounded everywhere in the central part of Batangas Province; and that the production of coffee was enormously profitable is testified to not only by living planters, but by the mute evidences of decadent wealth still visible in the then coffee-growing centers. From that time its history has been only a repetition of that of all coffee-growing countries in the Orient invaded by the leaf-spot fungus and root borer. In less than three years from the invasion of the disease the plantations were practically wiped out of existence. The variety grown was exclusively the Arabian berry, and natural conditions were exceptionally suitable for the best development of the plant as well as of fruit of peculiar excellence.

It is to-day quite out of the question to secure from any locality in Batangas Province enough fruit to ascertain what its maximum of excellence would be if submitted to the manipulations practiced on a modern Javanese coffee estate. Its past history gives assurance of a product so superior that it would be beyond competition with the coffees of Brazil, which now flood the markets of the world. This excellence was in a large measure due to the natural conditions which would prove equally beneficial in improving the quality of some of the more robust growing kinds.

To this end an importation of seed was made, and a large number of plants reared, of the Liberian and Maragotype hybrid, and these have been successfully transplanted and are now growing on the land selected in Lipa for this purpose. The entire plantation was plowed, cross-plowed, and harrowed. As it showed by test some soil acidity, one-half was top-dressed with lime at the rate of 1,000 kilos per hectare, the land lined out in two directions, and holes dug having a width and depth of 60 centimeters, the soil left exposed to atmospheric influences for two weeks, and the trees planted—the Maragotype at 4 meters and the Liberian at 4½ meters equidistant. The soil of the plantation is generally shallow, but of excellent quality, while the subsoil—a soft, crumbling rock—is freely permeable to both water and plant roots. An intercalary crop of corn is now maturing on the land and is to be followed by a rotation of sesamum or cotton. Plantings for shade have been dispensed with, the elevation (300 meters) and the vigor of the varieties selected being deemed sufficient to justify this departure from usual practices here, as elsewhere.

Very great dependence is placed upon the virtues of frequent and thorough cultivation, and, to effect this with the most lasting benefit, wide planting and the introduction of hoed crops for the first three years will be resorted to. While it is designed that this shall be the general treatment accorded to the whole plantation, portions have been marked off that will be subjected to more intense cultivation, to prophylactic sprayings, and to the systematic application of manures, pruning, etc. Records of outlay covering both methods are being

kept, by which it is expected that a balance sheet may be struck that will determine the practical commercial value attaching to each method.

The presence of a number of old scattered trees in the old plantations, unaffected in stem or root, indicates that the coffee borer has followed the course of many insect scourges, and, if it has not disappeared, it has at least abated for want of abundant material on which to thrive. A close watch will be kept and, should it reappear, systematic efforts will be made to stamp it out. *La Mancha* (*Hemileia*) is still in ample evidence, but it is hoped that one or both of the reputedly resistant varieties mentioned above may withstand its attacks. That there is any resistance that amounts to immunity is very doubtful, but it has been fully demonstrated that maintenance of the plant at all times in a good growing condition is most strongly conducive to immunity.

The coffee trees of Batangas succumbed to disease under a treatment of nearly absolute neglect. The present experiment contemplates continuous high-pressure tillage. General reliance, nevertheless, will be placed upon the alleged power of resistance of the varieties under observation, supplemented by such cultural treatment as will at all times guarantee the vigor and health of tissue so unfavorable to the propagation of parasitic diseases.

[From Report of the Philippine Commission, 1904, part 1, p. 400.]

CULTIVATION OF COFFEE.

Cocoa and coffee grow well in all of the pueblos of the province. The cocoa of Barbaza, known commercially as "Antique cocoa," is much sought after and brings a high price in the market of Iloilo; however, the production of these two articles is scarcely sufficient to satisfy local consumption at present. I have greatly wondered why it is that cocoa and coffee being of a quality superior to that of Lipa, they are not grown in quantities sufficient for export. This is a problem which I shall submit to the consideration of the municipal officers, and try to get them interested in encouraging the people of their respective pueblos to take up this very profitable business.

[From Report of the Philippine Commission, 1904, part 1, p. 411.]

Two years ago all the native officials and the Igorot chiefs were instructed to advise their people to plant coffee, with the result that now, in every barrio in Benguet, there are young coffee trees which will soon begin to bear, and as a consequence Benguet will take a prominent if not a fore place in the archipelago in the production of coffee.

[From Report of the Philippine Commission, 1904, part 1, p. 446.]

The gently rolling tableland just to the south of the level rice lands is admirably adapted to the cultivation of sugar. In former times, when sugar could be raised at a profit, its cultivation was one of the main industries of the province. There are many cane mills in the province, the motive power in most cases being the swiftly flowing streams from the mountains. Many of these mills are now in a dilapidated condition, but some are in active operation. The southern part of the province is closely wooded, with many scattered fields devoted to the cultivation of mountain rice, corn, and various vegetables. Formerly this section produced much coffee, and the coffee towns were the richest of the province. For several years past, however, the coffee trees have been afflicted with a scale or blight that in large part has destroyed the fruit-bearing power of the tree. Some coffee is still raised, but not enough to be of material consequence. The trees are still standing, and the crop last year was greater than that of the year before, making the owners entertain hopes that the trees may in time regain their productiveness. I have corresponded with the agricultural bureau on the subject, but their reply seems to indicate that as yet there is no known remedy that will kill the blight without at the same time killing the tree.

[From Report of the Philippine Commission, 1906, vol. 2, p. 43.]

INTRODUCTION OF A COFFEE WHICH RESISTS BLIGHT.

Three years ago a plantation of the variety of Brazilian coffee known as the Maragotype hybrid was started at Lipa, in the province of Batangas, with a view to determining the possibility of reestablishing the once important coffee

industry of that province, which had been ruined by borers and by the coffee blight known as Hemileia. The bushes on this plantation are now fruiting heavily and show no signs of infection with Hemileia, although Arabian Coffee bushes in the same neighborhood are badly affected and Hemileia has attacked practically all of the mountain plantations in Benguet and Lepanto-Bontoc.

It has been claimed that this Brazilian variety is lacking in productiveness, but 3-year-old bushes at Lipa and Manila are producing one-third of a pound each per year. Hemileia at one time practically ruined the coffee industry of Java, but it was reestablished by planting robust varieties which resisted the blight. It is confidently anticipated that the same thing may be done here, and present indications are that the variety above named will solve the problem.

[From Report of the Philippine Commission, 1906, vol. 2, p. 168.]

The plantation of Brazilian coffee, known as the Maragogype hybrid, made at Lipa three years ago, is fruiting heavily, and so far showing no signs of the Hemileia, the disease that destroyed the once prosperous coffee industry of Batangas. Arabian coffee in the same neighborhood is badly affected. This Brazilian hybrid is criticised as being lacking in productiveness, but at Lipa and at Manila three-year trees are showing quite a third of a pound per tree.

It is believed that gradually the coffee industry, all but lost, may be restored, at least up to the point of wiping out the imports of \$114,578 worth per annum. Java once lost an immense coffee industry from the same causes, and many years ago began building it up again by planting robust kinds of trees. That country has replaced one-third of her former great production.

[From Report of the Philippine Commission, 1904, vol. 2, p. 68.]

COFFEE PLANTATION AT LIPA, BATANGAS.

The manager of the Batangas station is also superintendent of the coffee plantation at Lipa, where 10 acres of young trees are thus far free from any sign of disease. The fact that the coffee plantations of Batangas Province, formerly a source of great wealth to the inhabitants, were annihilated in the years 1888 to 1890 has been mentioned in previous reports. The coffee growers were so discouraged that they have never made any effort to rehabilitate the industry. The present experiment is being conducted at government expense, with a view to demonstrating whether the reestablishment of the once important coffee-growing industry in the lowlands of the Philippines is possible. It may incidentally be mentioned that coffee of excellent quality is produced in Benguet, Lepanto, and Bontoc and that these mountain plantations, although badly cared for or utterly neglected, seem never to have suffered seriously from disease.

[From Census of the Philippine Islands, 1905, vol. 4, p. 76.]

COFFEE.

Prior to 1891 coffee was an important and remunerative product of certain provinces, and constituted a source of considerable wealth in the sections in which it was cultivated. In 1890 and for several preceding years the values of exports of coffee ranked fourth in order of importance and did not fall far below those of tobacco, having been 7.4 per cent in 1890, 7.1 per cent in 1899, 7.7 per cent in 1888, 8.3 per cent in 1887, and 5.3 per cent in 1886, of the entire value of exports.

Subsequent to 1890, due to the devastation of coffee plantations by insects and disease, the production of the berry rapidly diminished and finally almost ceased. Thus the value of its exports dropped to one-half of 1 per cent of all exports in 1893, and to 1.1 per cent in 1894, since when its production and exportation have been merely nominal.

The coffee of the Philippines has a fine aroma and excellent flavor, and will compare favorably with either Java or Mocha coffee. It is said to have been brought to the islands by Spanish missionaries during the latter part of the eighteenth century and its systematic cultivation to have commenced early in the nineteenth century. It was first cultivated in the province of La Laguna; subsequently in other provinces, notably Batangas and Cavite, coffee growing became an extensive industry. Most of the coffee was produced in the provinces named and in Tayabas, on Luzon Island, and in Misamis and the district of Cottabato, on Mindanao, though appreciable quantities were grown in other provinces. The highest grades of the berry were grown in Batangas Province and the most inferior on Mindanao Island.

Cultivation of Coffee in the Municipality of Lipa, Province of Batangas.

[By Hon. Simeon Luz, Governor of Batangas.]

Nothing appears of record in the official archives of the province of Batangas nor on the parochial books of the municipality of Lipa regarding the history of the introduction of the first coffee plants in this section; popular versions speak of its propagation by means of spontaneous growth.

It is also said that about 1808 there were only a few specimens of this plant in the orchards and gardens of some of the houses of the residents, which served as ornaments on account of their beauty while in blossom, and that the foxes would enter these gardens on their nocturnal expeditions to feed on the ripe berries of this little tree, and leaving their excrements with the grains in the mountains and woods which were their haunts, the berries would there germinate and sprout. These served later as seed beds or nurseries for subsequent plantings made by the residents, when the local authorities obliged each resident to plant a certain number of square feet of his land with coffee.

Don Galleo Reyes, a prominent native and resident of Lipa, coming, as he did, in frequent touch with the Spanish authorities and many foreigners who would stay at his house when visiting the celebrated Taal volcano, received information from them regarding the importance of this product in the commerce of the world. He took steps to encourage the propagation of this valuable plant among the natives, availing himself of his authority as petty governor. He continued the work of propagation during the years of 1812, 1822, and 1825, when he was elected petty governor of the town. His son, Don Santiago de los Reyes, elected petty governor in 1832, continued the work of his father and extended the area of coffee planting more and more, the residents securing seed with more facility as the plantations increased.

But the cultivation of coffee on a large scale did not begin in Lipa and in the adjoining municipalities (where many residents of Lipa own property)

until the year 1859, increasing gradually until 1889, when the disease occurred which completely destroyed the coffee plantations. The importance of this product was appreciated a few years before 1889, when the price on the market of Manila reached 20 pesos to 25 pesos per picul, having brought during previous years not more than 3 pesos, 5 pesos, 8 pesos, or 10 pesos per picul.⁴ The most active and enthusiastic planter on a large scale, who by his example gave a great impetus to the growing of the berry, was Don José Luz (my father), who at various expositions and fairs in this province during the years from 1867 to 1880, received the highest premium in this branch of agriculture.

While no method was observed in the beginning in the planting of coffee, in time the planters learned the good results to be obtained from planting the madre de cacao or anil in rows as a protection to the coffee tree.

The seed of the madre de cacao or anil is sown in rows at intervals of one step and a distance of 1 braza between the rows. The best season of the year for the planting thereof is during the months of May and June. About a year after the madre de cacao has been planted it has developed sufficiently to shade the spaces between the rows. Then the coffee plant is set out between the rows in parallel lines, leaving a distance of 1 braza between the plants. The shoots are obtained from the natural seed bed, as has been stated above. The madre de cacao is planted in this close manner so that, covering the earth almost completely with its shade, it will prevent the spontaneous growth of weeds, etc., which would interfere with the development of the coffee plant and the removal of which would be very expensive to the planter. Every year, between March and August, a clearing up takes place. The first year the lower branches of the protecting trees are removed, the second year some trunks, and the third year entire rows of the protecting trees, according to the development of the coffee plant.

Opinions of planters do not agree as to the time intervening between the planting of the protecting tree until the coffee plant begins to bear. The opinions vary between four, five, six, and seven years after the planting of the coffee plant. It is my belief that this varied experience of planters depends on many causes which have contributed to the more or less rapid development of the plant. There is no doubt that soil conditions, care in the reduction of the shade, and in the removal of weeds and undergrowth which choke the coffee plant contribute to its rapid development. But it may be asserted that six years must elapse before the profit from 1 hectare of planting would offset the cost of cleaning and caring for one year, although I believe that by adopting modern methods the time of fruition may be advanced one or two years. Many skilled planters agree that the average time required for the development of coffee is twelve years. A plantation of average fertility will yield from 12 to 20 piculs per hectare, provided it is given the greatest possible care and attention according to the methods observed by the natives in the cultivation and preservation of this plant.

The cost of planting the madre de cacao and coffee in 1 hectare of land represents an average of \$30, more or less, distributed as follows:

To plowing the land 3 times by 1 laborer in nine days.....	\$8. 46
Planting of madre de cacao, 2 men, two days.....	1. 25
Cost of 7 gantas of madre de cacao seed, at 25 cents.....	1. 75
Cost of coffee plants, 3,333 plants, at 50 cents per 100.....	16. 67
Wages of 5 laborers for the planting of coffee in two days, at 30 cents per day.....	3. 00
Total.....	31. 13

The blossoming of the plant depends on the last rains of the preceding year or the first rains of the following year. It is also governed by the condition in which the plant was left after the last crop with regard to the bruising and injuries to the axils.

Coffee blossoms three times—first in January or February, second in March or April, third in May or June. Hence there are three crops—between August and September, in October, and in November—the maturity of the berry lasting seven months.

* The equivalents of the weights and measures here used are as follows:

1 picul=63.262 kilograms=139.467 pounds avoirdupois.
 1 braza=1.671812 meters=5.49 feet.
 1 hectare=2.471 acres.
 1 ganta=3 liters=6.34 pints.
 1 cavan=75 liters=19.81 gallons.

If the rains are heavy in November or December, the coffee will begin to blossom in January or February. If there be no rain in the first-named months, nor in January or February, neither the first nor the second crop will mature, as the night dews are not sufficient for the purpose. Many planters are of the opinion that the abundance of the annual crop would be greatly improved by irrigation.

The method observed in harvesting the crop is very primitive. It consists in picking the berries with the hands and placing them in a basket hanging from the waist. As it is not possible in a majority of cases to reach the upper branches, each picker provides himself with a hook, made of a branch of the madre de cacao, with which he draws down the branch, holding the latter down with his feet, and thus leaving both hands free for picking the ripe berries. The coffee picker receives no wages for his work, but retains one-fifth of the coffee picked during the day. Hence, being anxious to pick as much as possible, he does not care what damage he does to the plant, usually breaking and destroying the most vigorous branches of the bush. One of the hardest tasks of the planter is to watch out for this during the time of the harvest, as reduced crops are sometimes due to the damage done to the plants.

The process of drying consists in leaving the grains in small piles to ferment for twenty-four hours and then spreading them out in an inclosure specially constructed for the purpose, called a "bilaran," made of clay and cement well leveled and polished, until the grains have acquired a hardness sufficient to resist the action of the cleaning instruments, which consist in the primitive mortar and pestle usually used for the cleaning of rice.

This method of drying takes much time and work. If it be done during the rainy season, in most cases the grain does not acquire sufficient hardness, nor does the outside covering become sufficiently brittle until thirty and sometimes fifty days have elapsed after they have been spread out in the bilaran for drying. This causes not a small loss to the planter, as many of the berries rot.

The cost of cleaning, airing, sifting, and sorting 1 picul of coffee is about \$1 Mexican.

There is another method for drying coffee, which is used by planters on a small scale. This method consists in removing the outside pulpy rind of the grains, which, after being carefully washed, are placed in the sun to dry. After four or five days they have become sufficiently hard for the operation of cleaning. A machine moved by a hand winch is used for removing the outside hull. This triturates the first rind without doing injury to the second. The machine is made of wood and is called "pipisan." This method saves much time, but the washing operation is very laborious, and in places at a distance from springs and rivers it is practically impossible to do the washing on a large scale. The coffee with the inside skin or rind prepared according to the last-named method is called "butil," while that prepared according to the first-named method is called "bayate."

The cost of weeding and caring for a hectare of a coffee plantation varies according to the method adopted by the planter. Many who consider only the preservation of a clear soil leave the protecting trees with all their branches which cover the ground completely with shade and do not permit weeds to grow. This method is very cheap. On the contrary, a planter who understands that too much shade, while it favors the preservation of a clear soil, injures the florescence and maturing of the plant, takes special care to remove part of the branches of the protecting tree and spends much more in the care of his plantation.

The average cost of caring for 1 hectare of a coffee plantation may be estimated at \$10 Mexican per annum.

As I have stated above, the average crop from 1 hectare of a coffee plantation, carefully attended to and without sparing expense for weeding and thinning out of the branches of the protecting tree, is from 12 to 20 piculs, but most plantations have yielded only an average of from 6 to 10 piculs per hectare on account of various causes which have affected the crop. One of the principal causes is the failure to reduce the shade in order to save expense in weeding the soil. Coffee requires shade, but not too much. It requires breathing space. It needs the sun, without receiving its direct rays. Hence, the branches of the protecting tree should be thinned out and cut down for 3 yards above the highest branch of the coffee, in order to permit the humid air to have free access to the plant.

The duration of the bearing life of the coffee plant is unknown, although some old inhabitants of the locality relate that among the plantations destroyed

in 1889 there were some which had been in existence for more than fifty years, and which still bore when in a dying state.

The highest prices which this article brought in the Maulla market in 1890 were 25, 30, and 35 pesos per picul.

The total crop of the territory comprised in the municipality of Lipa in 1887, 1888, and 1889 reached approximately 60,000, 80,000, and 100,000 piculs, respectively, according to reasonable estimates made by the principal merchants and planters of this town.

The lands most suitable for the growing of coffee, in the opinion of the most skilled planters in Lipa, are high and inclined lands which do not retain the water, although it is believed that nine-tenths of the territory of Lipa is excellent for coffee.

Two kinds of worms caused the total destruction of the coffee plantations of Lipa and of the other townships of the province—the “hunus” and the “bagumbung.” The hunus attacks the main trunk and the roots of the tree and the bagumbung the branches. These two worms are almost identical in form, although very different in the residuum they leave and in the method of destruction. They have been made the subject of study by a Spanish expert, Mr. Domingo Sanchez, civil engineer, sent by the former Spanish Government to investigate this evil. He published a pamphlet, giving the result of his studies, which was printed at the expense of the Spanish Government and which contained a description of the life and development of these insects. This pamphlet should be on file in the archives of the present government. These worms were known to all the planters from the time of the introduction of coffee into the province, and every year they did some damage to the plantations. This damage was so small, however, that no one bothered about seeking a remedy for an evil which he did not believe could cause a complete destruction of all coffee plantations. But in 1889, to the great surprise and fear of all, it was observed that all the plantations of the province were attacked. That year saw the total loss of the crop and the death of almost all the coffee plants throughout the territory which Lipa comprises.

From the trunks which remained new healthy branches grew, and two years later, as if by enchantment, the hunus and the bagumbung disappeared; but another more terrible and persistent enemy appeared (as up to the present time no other disease is known) in the form of yellowish-red spots which appear on the leaves after the blossoming period and at the beginning of fructification.

In the months of May and June, if the rains are plentiful, the coffee plant presents a luxurious aspect, which at first sight pleases the planter, reminding him, as it does, of the times when no disease was known to affect the plant. But with the increase of the rains the spots begin to appear, which increase in size until they attain the dimensions of a Philippine peseta, and have a dust which bears a resemblance to the description of the French mildew, recognized as a true microscopic vegetable fungus. As the spots increase the leaves become yellow, dry up, and finally drop off, leaving the branches in December or January entirely bare until the months of March and April, when the plant blossoms. No one has as yet made a study of the last-named disease nor sought a suitable remedy to combat it.^a

The planters of Lipa and other municipalities of the province lost all hope of reviving coffee in that locality, and cleared their lands of this plant in order to grow sugar cane, rice, and corn. I believe that hardly one one-thousandth part of the former coffee plantations are now in existence.

Before 1889 about two-thirds of the territory comprising the district of Lipa was planted in coffee, and only one-half of the plantations were bearing, the remainder of the plantations having a life of from one to six years.

The madre de cacao and the anil are two trees known as coffee protectors. These trees are excellent as protectors for the coffee plant because they develop so rapidly. The madre de cacao, furthermore, is one of the best classes of building woods, the only defect being that it does not attain the size of the “molave” and “banaba.” It has the hardness and resistance to weather which the molave has. The supports of 90 per cent of the houses of the barrios and of the towns are made of this valuable wood, and it is believed that it will last from twenty to forty years under the ground. The anil is a tree with a thick trunk, but of no use for building purposes, as its wood is soft and porous.

^a The disease referred to is the “leaf blight,” caused by *Hemileia vastatrix*, a microscopic fungus parasite.

The insular bureau of agriculture is conducting experiments with a special class of coffee in Lipa, and many of the residents are anxiously awaiting the results, because everyone is convinced that coffee is the only product that can save the critical situation of the residents of this municipality, which was formerly so wealthy.

All the municipalities adjoining Lipa have had coffee plantations, although not on so large a scale, and I am of the opinion that most of the municipalities of the province possess large areas of land suitable for the growing of coffee.

A rich resident of Manila owns, in the municipality of San José, a plantation of Liberia coffee of considerable extent, and with proper care it would yield large crops. I do not know the extent of the crops during the past few years, but persons skilled in the matter state that it does not produce as much as the primitive coffee.

Coffee Culture in the Province of Benguet.

[By Hon. W. F. Pack, Governor of Benguet.]

The Benguet coffee, or as good as the Benguet coffee, is advertised for sale by the merchants of the Philippines and in Spain, but there is little even raised, let alone put on the markets of the world.

It is indeed a rare coffee for both flavor and cleanliness. There is no blight that has ever attacked the coffee plant of Benguet. The altitude, temperature, and humidity of the air all combine to make this province peculiarly adapted to the successful growth of coffee; still, in 1901 there were only 697 cavans raised in the province and last year, 1902, but 852. New coffee plantations are being planted and in a few years the real Benguet coffee will be on the market.

Coffee was first introduced into this province by the Spaniards in 1875, by the military governor, Manuel Scheidnegal y Sera, who planted in the vicinity of Gallano, forming a government garden for the experiment. But while the plants thrived therein, he did not achieve the success anticipated, owing to the low altitude and heavy rains, which affected the flavor of the coffee planted, that situation being more favorable for a Rio than for the Java of Arabia, with which this progressive governor was experimenting. However, the plants grew luxuriantly, and in 1877 his successor, Governor Enrique Oray y Bravo, transplanted to the plateaus at an altitude of from 4,000 to 5,000 feet, and distributed seeds among the people of the barrios of the province.

The native Igorots neither favored nor opposed at this time the introduction of this product; but in 1881, the plants having come to the bearing stage, Governor Villena endeavored to force the cultivation and enlargement of coffee plantations by ordering all natives of the province to plant, grow, and work coffee. This created an opposition that in Daklan extended so far that the Igorots there, acting under the advice of their old men, attempted to destroy the plantation by pulling out young plants; but to pull up the young coffee plant and throw it on the ground does not necessarily kill it, and the coffee resprouted. After this the natives went so far as to pour boiling water on the plants to kill them, and did succeed in Daklan in killing out the coffee culture.

In Kabayan the natives were under the domination of a young Igorot chief named Camising. This young chieftain had secured his influence and power over his followers not merely through his wealth, which consisted of herds of cattle and horses and large rice sementeras, but also because of his exceptional valor in personally defending his people against the attacks of busoles, or head-hunters, of the North. He bears to this day the scars of many hard-fought battles. This young chief, after many visits to the capital and much study and observation of the new product that was being forced upon his people, became thoroughly satisfied that it would be very valuable to them; he therefore took upon himself the duty of introducing the coffee into Kabayan.

Under his leadership it was planted, cultivated, and grown, and no opposition to its culture was permitted for an instant. In four years they began gathering crops. Camising took charge of the sale of their crops, and discovered that the coffee was constantly increasing year by year in value per cavan. He himself went to the coast to learn its worth—a long trip in those days for a mountain Igorot. They gradually enlarged their coffee fields, and last year five-eighths of the coffee of the province was grown in Kabayan.

Meantime the Igorots of Daklan, who had destroyed their first plant, discovered that their neighbors in Kabayan were exceedingly prosperous, that they had much money, and that, comparatively speaking, gave but little labor

for the money they received. So, though at a late date, they endeavored to retrieve their error, and have planted large fields, and will, undoubtedly, in the course of a few years, successfully rival Kabayan in the amount of coffee produced.

The coffee raised in the highlands of Benguet has been bought in by the Tabacalera Company year after year, and the entire crop shipped to Spain, and there disposed of at fabulous prices. None of it went on the market in Manila. But little has ever been used in Manila, and that little only by the friends of residents of Benguet or officials of the Tabacalera Company, by favor. It is the aim of the present government to foster this enterprise by every means within its power among the natives of the province; nor do I doubt that in the future the white man with his inherited enterprise will enter this territory for which nature has done so much, and make it the coffee producing province of the archipelago.

A coffee plant six years old should produce 3 pounds of coffee a year of a most desirable flavor, and there is little danger of the destruction of the crop by blight. The demand for this coffee will always be greater than the possible supply. The only obstacle in the way of making coffee cultivation a most profitable industry is the difficulty of obtaining suitable labor. The question of labor will depend entirely upon the individual. The cost of labor for hacienda or ranch purposes will average from 5 to 10 cents gold a day, depending upon the kind of labor required and the age or sex of the laborer.

As these coffee plantations now in the province have been planted and cared for mostly by the women, and at odd moments when they were not otherwise occupied, it is impossible to estimate the cost of making or caring for a coffee plantation, but it is usually estimated by growers who are so far civilized as to figure on profit and loss, that the coffee trees, after an average age of five years, should net the owner 25 cents gold each year. These trees may be planted 6 feet apart. This coffee sells in the market in Benguet to-day at from \$6 to \$7.50 gold a cavan, which should weigh about 67 pounds.

[From Census of the Philippine Islands, vol. 4, 1903, p. 207.]

CULTIVATION AND PRODUCTION OF COFFEE IN THE PHILIPPINES.

Coffee culture was a fairly important agricultural industry in the Philippines prior to 1898, but the ravages of insect pests reduced it to small proportions, and in 1902 only 999 hectares were reported as devoted to its production, the total quantity produced amounting to only 181,091 liters. About a third of the insular coffee area was in the province of Cavite, in which 330 hectares were reported; Batangas ranked second in area, with 145 hectares, and Lepanto-Bontoc third, with 125 hectares. In the other provinces and comandancias producing coffee the areas ranged from 1 to 86 hectares, except in a few in which there was no production or such small yields that the areas were not reported.

The apparently wide divergencies in yield per hectare in the different provinces and islands are very remarkable, as shown in the two following statements, which indicate the portions of the archipelago in which the culture has attained the greatest success. This seeming difference in productiveness is largely accounted for by the fact that in several provinces coffee trees had been planted, but had not come into bearing at the date of the census; the areas of land upon which they were planted were reported by the enumerators; there is, therefore, no real relation between the figures of area and of production of this crop. In the two statements the provinces and islands are arranged in accordance with their importance as producers of coffee, those producing the largest quantities being placed first; the ones producing less than 5,000 liters are grouped together, their separate production being too small to be of significance.

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AREA IN CULTIVATION AND PRODUCTION OF COFFEE IN THE PHILIPPINE ISLANDS, BY PROVINCES AND ISLANDS: 1902.

Rank.	Provinces and islands.	Area of cultivation.	Quantity of coffee produced.	Average per hectare.
	Total Philippine Islands	Hectares. ^a 999	Liters. 181,091	Liters. 181
	PROVINCES.			
1	Ilocos Norte.....	16	23,400	1,463
2	Nueva Vizcaya.....	18	19,650	1,092
3	Batangas.....	145	18,450	127
4	Lepanto-Bontoc.....	125	17,400	139
5	Albay.....	30	13,500	450
6	Benguet.....	24	13,050	544
7	Cavite.....	330	10,350	31
8	Misamis.....	4	8,700	2,175
9	Leyte.....	10	6,525	653
10	La Union.....	3	6,225	2,075
11	Tarlac.....	10	5,775	578
	All other provinces ^b	284	38,066	134
	ISLANDS.			
1	Luzon.....	912	157,344	173
2	Mindanao.....	11	6,370	579
	All other islands.....	76	17,377	229

^a 1 hectare=2.471 acres.

^b Including comandancias.

ACREAGE AND CROP OF COFFEE IN THE PHILIPPINE ISLANDS, BY PROVINCES, COMANDANCIAS, AND PRINCIPAL ISLANDS: 1902.

[From Census of the Philippine Islands, vol. 4, 1903, p. 325.]

Province, comandancia, or island.	Area in cultivation.	Quantity produced.	Province, comandancia, or island.	Area in cultivation.	Quantity produced.
	Hectares. 999	Liters. 181,091		Hectares.	Liters.
Philippine Islands			Manila city		3
PROVINCES AND COMANDANCIAS.			Misamis	4	8,700
			Negros Occidental	7	525
			Negros Oriental	3	1,050
Abra	3	150	Nueva Ecija	15	1,425
Albay	30	13,500	Nueva Vizcaya	18	19,650
Ambos Camarines	33	900	Pampanga	3	3,525
Antique	6	900	Pangasinan	21	4,500
Basilan ^a	21	75	Paragua	1	18
Batangas	145	18,450	Paragua Sur ^a		33
Benguet	24	13,050	Rizal	4	525
Bohol	5	750	Romblon	2	375
Bulacan	2	2,850	Sorsogon	3	600
Cagayan	86	1,805	Surigao		15
Capiz	2	300	Tarlac	10	5,775
Cavite	330	10,350	Tayabas ^b	21	4,575
Cebu	7	2,925	Zambales	10	3,655
Cotabato ^a	2	225	Zamboanga ^a	3	300
Dapitan ^a		30			
Davao ^a	3		ISLANDS.		
			Bohol	4	375
Ilocos Norte	16	23,400	Cebu	7	2,925
Ilocos Sur	1	782	Leyte	1	675
Iloilo	9	825	Luzon	912	157,344
Isabela	3	3,275	Marinduque	1	300
Jolo ^a		75	Mindanao	11	6,370
La Laguna	8	1,575	Negros	9	1,225
La Union	3	6,225	Panay	17	2,025
Lepanto-Bontoc	125	17,400	All other islands	37	9,852
Leyte	10	6,525			

^a Comandancia.

^b Including the subprovince Marinduque.

COFFEE PRODUCTION.

[From the annual report of William F. Pack, governor of the province of Benguet, January 18, 1902; hearing before the Philippine Committee, 1902, p. 2418.]

Coffee is the only production in excess of consumption of the province, and the surplus is small, having never been over 600 cabanas, and this year being about 400. It is, however, of a remarkably fine grade, being a good-sized berry, perfectly clean, without blight, and possessing a flavor equaled only by a combination of the best Mocha and Java.

[From Senate Document 186, Fifty-seventh Congress, second session, p. 73.]

One of the most important commodities imported into the United States is coffee, of which we are unable to produce a pound.

The United States importations during the past three years have been as follows:

Year.	Quantity (pounds).	Value.
1900.....	787,802,361	\$52,468,041.28
1901.....	855,674,759	62,890,205.27
1902.....	1,000,636,832	70,919,257.81

As will be seen by the following figures and statements, the entire central portions of some of the Philippine Islands are adapted to the production of coffee, they produce a superior article only equaled by the best Mocha, and in the past they have exported large quantities of this valuable product.

A few years ago the borers invaded the coffee plantations, and, owing to the fact that the people were devoid of the necessary agricultural science to check the ravages of this pest, the bulk of the plantations were devastated.

In near-by Java millions of dollars find profitable investment in the production of a coffee not equal to that of the Philippines, much of it being shipped to the United States, and with an unlimited American market, coupled with the fact that we are unable to grow a pound of coffee, this industry in the Philippines is worthy of the attention of capital.

[From report of Edward W. Harden, special commissioner of the United States.]

Coffee was an important industry until a few years ago, and large coffee plantations have been established in various parts of Luzon and other islands of the group. In 1891 an insect made its appearance on the coffee plantations which destroyed the plants, and practically all of the big coffee plantations have now been abandoned. During the year 1897 exports of coffee were only 2,236 piculs, but this was an increase of 804 piculs over the shipments of the preceding year. Efforts have been made to stop the ravages of the insect which has destroyed the coffee plantations, but so far with only partial success. It is believed that a careful study by experts would discover a means of killing the insects and that the coffee industry would once more assume its old-time proportions. For the year 1897 the value of the coffee exported from the Philippine Islands was only \$96,100. When the industry was at its height shipments were made of more than \$4,000,000 in a single year. The shipments of coffee to the various countries were as follows:

	Piculs.	Pounds.
Europe (continent).....	1,986	275,680
China and Japan.....	246	34,400
Australia.....	12	1,684
Singapore and India.....	9	1,260
Total.....	2,236	318,040

[From El Cafetal, New York, August, 1903.]

ECONOMIC IMPORTANCE OF THE COFFEE INDUSTRY.

The cultivation of coffee is a branch of tropical agriculture of greater importance and extent than the general public and the planters themselves can imagine. From the results of a careful compilation of statistics recently collated and published from various governmental and private sources for the period from 1900 to 1902 the following data are calculated:

The total number of coffee plantations in the world, large and small, but which can properly be classified as such in the full meaning of the word, reaches 49,000, distributed among the three coffee-producing continents—America, Asia, and Africa.

Their total annual production of coffee amounts to more than 21,500,000 bags, of an average weight of 134 pounds each, or 2,881,000,000 pounds.

This production represents a total value of more than \$255,000,000 annually contributed by the coffee industry to the world's trade and commerce. Such a grand total is realized by the annual net product of more than 1,800,000,000 coffee trees in full bearing.

The land used for coffee growing, exclusive of the area used for the production of other fruit in connection with coffee, exceeds 3,600,000 acres. The value of the property, including buildings, machinery, and other utensils is more than \$1,350,000,000, based on the low values that have prevailed from 1900 to 1902.

The average total number of persons engaged during the year in planting, tending, harvesting, curing, and handling the crop, including office force, reaches 2,220,000 men, women, and children.

The total amount paid annually in wages and salaries to laborers and the office force, exclusive of interest on capital, taxes, etc, exceeds \$135,000,000.

Upon these data the following interesting average calculations are based:

The average area of each plantation exclusively devoted to cultivation of coffee is 73½ acres.

The number of coffee trees in full bearing is 36,735 for each plantation.

The average yield of raw coffee (en oro) is 1½ pounds per tree.

The average number of trees planted per acre is 500.

The average production of each plantation is 58,796 pounds of coffee.

The production per acre is 800½ pounds.

The average number per year of laborers and other persons employed on each plantation is 45, or one for every 1½ acres under cultivation, or one person for 818 coffee trees, equivalent to one person for each 1,309½ pounds of coffee produced and prepared.

The average annual salary paid to each employee is \$61.36.

The average cost of labor in the cultivation, production, and preparation of coffee is 4.7 cents per pound.

The average value of each coffee plantation, including the value of buildings, machinery, and other utensils, is \$27,551, or \$375 per acre.

The average return for each plantation through the sale of its entire product of coffee is \$5,204, or at the rate of 8½ cents per pound of coffee.

[The following is from the Monthly Summary, Treasury Department, June, 1902, p. 1246.]

Coffee.—Despite the ravages occasioned by worms a few years since, which so discouraged coffee planters, the growing of coffee, which, in the past, frequently stood third in importance as one of the principal articles of export, may again become one of the most profitable industries of the Philippines. That it may be highly remunerative has been fully demonstrated in the vicinity of Lipa, in Batangas Province.

[From Monthly Summary of Commerce of the Philippine Islands, December, 1904, p. 629.]

INTEREST IN COFFEE EXPORTS CHIEFLY HISTORICAL.

The coffee exports of the Philippines have long since ceased to be of any importance, and a review of the industry has an interest chiefly historical. From this point of view, however, these exports assume considerable importance, and in the banner years of production, 1883 and 1884, with export quantities exceeding 16,000,000 pounds and values exceeding \$1,000,000, they represent an industry of no little significance in the agricultural assets of the islands.

DEVELOPMENT AND DISAPPEARANCE OF EXPORT TRADE EMBRACED WITHIN HALF CENTURY.

Within the half century of figures under survey is practically embraced the complete history of the industry, the record of its development, maturity, and destruction—1,246,479 pounds are given as the coffee exports of 1855, and with steady increases thereafter the industry seems to have reached its maximum period of productiveness during the eighties. It is stated that coffee production in the islands received a serious setback in 1880, due to ravages of an insect pest in the plantations, which was succeeded by a leaf blight that completed the unfinished work of the earlier calamity. The figures show that with exports amounting to 13,709,647 pounds in 1889, they had precipitately declined to 642,595 pounds four years later; while in the American period, with maximum exports of 68,228 pounds in 1901, and but 22,492 pounds in the present year, further emphasis is given to the extent of the adverse conditions that affected production in the early nineties, and the Philippine coffee industry is stamped as a thing of the past.

PRICES.

Philippine coffee, though stated by some to rival in quality that of Java, does not seem to have received such recognition in the markets of the world. Prices during the years of the highest production were only about 7 cents a pound, but in the diminishing production of the latter eighties and 1890 they had a great increase, and export values in spite of reduced quantities exceed \$1,500,000, and represent an importance and degree of prosperity for the industry much in contrast with the \$3,153 worth of coffee exported in the present year.

COUNTRIES SHARING IN THE EXPORT TRADE.

The chief consumers of Philippine coffee have been Spain, the United Kingdom, and the United States, together with a confused but important China-Hongkong trade. Spain has figured throughout, but most conspicuously in the period of greatest and declining production, when her share of the total exports ranges from one-third to two-thirds. The China-Hongkong trade has been of about equal importance to that of Spain, though in the reduced figures of the early nineties it amounts to but about half the Spanish. The United Kingdom was the most conspicuous taker of these exports during the greater part of the seventies, but in the increased quantities of the eighties played a minor part. The United States purchases of Philippine coffee were heaviest in earlier times, reaching 1,350,707 pounds in 1866. After 1880 in but the single year 1883 do they amount to as much as 100,000 pounds, and are of little relative importance. In the insignificant coffee exports of the American period, the United States takes about a third in the present year, but China has been the largest constant purchaser of the quinquennial period.

LARGE IMPORTS IN 1904 VERSUS NOMINAL EXPORTS.

The figures under review indicate the prosperous past of the Philippine coffee industry and show its virtual disappearance as an export factor. To what extent it still contributes to the domestic market there is no means of knowing, and it may only be inferred from the fact that contemporary with the nominal exports of recent years there have been imports for domestic consumption of relatively large quantities, amounting to 998,198 pounds in 1902 and 396,857 pounds in the present year. This point, however, is aside from the purpose of the present review, except in as far as it indicates the existing basis for the restoration of the industry to future export importance; and in view of the figures given, combined with facts bearing upon them, it would appear that the outlook for such a restoration is not promising.

OUTLOOK FOR THE REVIVAL OF THE INDUSTRY.

Much has been recently said of the revival of the industry and the aid of an American import duty on coffee in connection with free trade for the Philippine product as a means to this end. The disposition in certain circles is to treat this once profitable industry as an asset in the plans under consideration for

bringing prosperity to the islands. It may be so regarded in a way, for the rich returns of the coffee plantations and the suitability of soil and climate to production are matters of record; but it is to be borne in mind that coffee plantations with their rich returns are of slow growth, requiring outlays of capital and from six to twelve years of patient attention and waiting for the first realization of these returns. Extensive investments of this character do not seem probable with the memory of the calamity of fifteen years ago still fresh, and especially in view of the fact that scientific research seems to have failed thus far to find a means of successfully combating the scourges that have destroyed the industry. Not until such a means is found to prevent the repetition of that disaster, and even then not for some years does it seem probable that there will be any large return of confidence and capital to the planting of coffee on such a scale as to make it again an important factor in the agricultural wealth of the islands. The future of the Philippine coffee industry seems for the present to be in the hands of the scientist and agricultural expert.

[From Monthly Summary of Commerce of the Philippine Islands, December, 1904, p. 785.]
Quantity and value of coffee exported from the Philippine Islands, by countries, calendar years 1855-1884.

Year.	United States.	United Kingdom.	Spain.	China.	British East Indies.	French East Indies.	Other countries.	Total.
1855 * {Pounds.	428,319	210,573	19,858	70,053			1,912,585	2,641,337
1856 {Dollars.	29,244	14,739	2,614	6,041			1,053,386	216,184
1857 {Pounds.	398,669	109,438	111,009	331,512			1,750,640	2,701,223
1858 {Dollars.	38,948	10,920	13,501	37,815			1,087,822	206,086
1859 {Pounds.	295,106	136,179	435,992	228,067	7,564	73,501	2,074,981	3,241,340
1860 {Dollars.	27,764	10,811	41,094	23,132	634	7,050	200,689	310,174
1861 {Pounds.	349,576	249,135	53,919	615,310	965	276	724,251	1,968,462
1862 {Dollars.	40,085	21,364	5,443	556,588	98	21	69,147	192,066
1863 {Pounds.	637,233	244,221	700,531	533,121	12,411	552	2,332,027	4,600,206
1864 {Dollars.	73,250	13,438	39,685	56,189	754	60	245,023	431,859
1865 {Pounds.	940,755	625,276	222,106	425,541	21,505	27,800	322,376	2,585,545
1866 {Dollars.	105,008	51,536	25,003	48,984	2,608	3,126	31,786	296,601
1867 {Pounds.	647,694	305,942	1,724	774,901		1,623	843,109	2,574,853
1868 {Dollars.	94,864	25,351	244	109,341		222	94,984	327,086
1869 {Pounds.	1,156,923	364,369	300,101	1,297,578			837,894	3,976,855
1870 {Dollars.	151,850	66,770	34,746	157,313			118,082	528,611
1871 {Pounds.	594,594	1,208,614	1,690,905	234,297	86,021		1,398,506	4,112,527
1872 {Dollars.	59,371	118,259	65,988	25,726	9,545		154,219	433,118
1873 {Pounds.	1,359,709	733,761	209,913	221,005	253,803		985,172	3,740,026
1874 {Dollars.	164,887	74,111	26,295	23,652	35,358		115,621	439,825
1875 {Pounds.	1,350,441	1,081,178	738,285	198,899	179,205		1,434,851	4,932,859
1876 {Dollars.	139,906	150,837	83,949	25,420	10,670		149,206	559,992
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Quantity and value of coffee exported from the Philippine Islands, by countries, calendar years 1855-1884—Continued.

Year.	United States.	United Kingdom.	Spain.	China.	British East Indies.	French East Indies.	Other countries.	Total.
1879.....	14,076 (Pounds.....)	1,222,815	3,825,585	3,964	2,545,575	141	940,069	8,552,185
1880.....	1,611 (Dollars.....)	137,859	439,351	486	283,003	18	123,640	886,568
1880.....	24,965 (Pounds.....)	686,409	3,836,008	3,205	3,905,976	2,852,404	139	11,309,108
1881.....	2,984 (Dollars.....)	146,363	441,006	384	718,082	368,208	14	1,677,670
1881.....	348 (Pounds.....)	2,498,650	5,204,679	2,074	4,564,510	-----	-----	12,270,261
1882.....	29 (Dollars.....)	210,114	437,667	174	383,834	-----	-----	1,031,818
1882.....	3,474 (Pounds.....)	4,350,216	2,545,394	3,276	4,185,552	1,294,082	-----	12,332,244
1883.....	292 (Dollars.....)	562,440	28,722	276	351,536	107,760	-----	1,041,046
1883.....	137,333 (Pounds.....)	5,588,743	3,833,817	4,184	7,239,995	278	85	16,905,291
1884.....	11,069 (Dollars.....)	400,059	272,633	909	434,680	24	42	1,118,786
1884.....	7,732 (Pounds.....)	171,412	8,138,762	2,515	8,277,255	139	862	16,599,677
1884.....	568 (Dollars.....)	12,314	659,020	215	611,996	10	72	1,294,185

NOTE.—Hongkong included under China from 1856-1867, and from 1873-1884 under British East Indies.

[From Monthly Summary of Commerce of the Philippine Islands, December, 1904, p. 629.]

Quantity and value of coffee exported from the Philippine Islands, by countries, calendar years 1885-1894—1900-1904.

Year.	United States.	United Kingdom.	Spain.	China.	Hongkong.*	British East Indies.	French East Indies.	Other countries.	Total.
1885.....	71,550	296,063	5,487,670	1,993	.....	5,239,990	838	956,286	12,033,762
.....	5,138	19,269	392,293	96	.....	342,480	50	61,284	830,610
1886.....	94,564	301,473	6,571,960	.....	.....	6,909,415	1,897,574	1,461	15,776,973
.....	3,868	22,362	465,328	.....	.....	435,337	109,884	122	1,060,021
1887.....	93,843	1,375,254	6,106,500	483	.....	3,218,841	31,978	78,365	10,408,244
.....	5,719	227,138	920,478	80	.....	443,069	4,889	10,626	1,612,009
1888.....	115	2,726,025	4,943,822	4,673,068	.....	1,734,963	7,625	.....	14,065,619
.....	12	254,708	533,065	434,265	.....	246,923	825	.....	1,500,418
1889.....	.....	2,254,245	5,249,644	5,207,569	.....	853,783	143,967	419	13,709,647
.....	.....	311,959	776,253	668,562	.....	102,923	18,404	73	1,818,544
Average annual.....	52,014	1,390,610	5,672,527	1,976,489	.....	3,691,400	416,401	207,404	13,306,856
.....	3,355	167,067	611,601	230,679	.....	318,144	36,881	14,423	1,862,120
1890.....	.....	365,068	4,396,649	4,678,135	.....	333,987	110,508	.....	9,876,317
.....	.....	174,677	744,720	741,967	.....	38,766	10,316	.....	1,538,416
1891.....	.....	62,647	4,860,534	870,962	.....	207,947	16,254	.....	6,264,457
.....	.....	53,100	801,631	114,973	.....	12,796	2,671	.....	936,040
1892.....	.....	193,105	2,176,828	556,048	.....	46,106	18,388	5,192	2,994,671
.....	.....	54,581	822,211	82,187	.....	2,208	2,600	813	434,550
1893.....	.....	12,264	564,545	48,560	.....	3,073	141	.....	642,595
.....	.....	1,243	90,686	8,411	.....	116,915	25	2,068	103,439
1894.....	.....	.....	1,012,565	189,613	.....	4,384	.....	10,586	1,329,718
.....	.....	.....	143,666	28,886	.....	141,586	.....	1,263	177,689
Average annual.....	147,027	20,304	2,628,490	1,268,662	.....	1,737	29,039	6,774	4,221,647
.....	.....	2,171	420,573	186,176	.....	1,100	3,122	1,088	682,009
1900.....	146	.....	3,623	1,430	20,817	.....	.....	688	29,825
.....	25	.....	487	225	1,777	.....	.....	108	3,142
1901.....	1,882	877	3,064	10,920	24,991	.....	.....	2,461	68,228
.....	225	160	286	902	1,832	.....	.....	262	5,437
1902.....	.....	.....	.....	6,190	7,696	.....	.....	288	16,469
.....	.....	.....	.....	1,009	106	.....	.....	2,432	2,432
1903.....	.....	.....	.....	4,801	1,485	.....	.....	1,251	8,337
.....	.....	.....	1,278	8	190	.....	.....	171	1,086
1904.....	6,648	198	1,342	9,614	68	.....	.....	4,622	22,492
.....	707	30	1,565	12	.....	.....	.....	3,153	694
Average annual.....	1,725	669	1,848	6,491	10,798	5,699	.....	1,846	29,068
.....	191	113	209	861	1,012	419	.....	287	3,062

* Hongkong included under British East Indies from 1885-1887, and from 1888-1894 under China.

NOTE.—Figures prior to 1900 are taken from "Estadística general del comercio exterior de las Islas Filipinas," issued by the Spanish Government, and all quantity reductions necessary in preparing the different tables herewith have been on the basis of kilogram=2,204 pounds, picul=137.9 pounds, quintal=101.44 pounds.

[From Monthly Summary of Commerce and Finance of the United States, July, 1905.]

THE COFFEE TRADE IN 1905.

The coffee situation in the United States; recent interest in the industry.

The commercial conditions of the coffee industry have attracted the attention of the American business world to an increased degree since 1898, when Porto Rico, Hawaii, and the Philippines came into our possession. Previous to that date our interest in the coffee trade lay solely in the fact that we were the largest consumers of coffee. We still hold this position, as may be seen from the following summary:

Consumption of coffee in certain leading countries in 1904.

Countries.	Pounds.	Countries.	Pounds.
United States.....	960,879,000	Austria-Hungary.....	106,687,000
Germany.....	396,205,000	Holland.....	28,930,000
France.....	167,552,000	United Kingdom.....	28,783,000
Belgium.....	125,411,000	Canada.....	6,189,000

In other words, we consumed nearly two-fifths of the world's production of 2,299,270,000 pounds in 1904, the term production being understood to mean the quantities exported and imported, for the home consumption of the producing countries can not be ascertained. The consumption of Germany, the next largest, is but little more than two-fifths of ours.

The events of 1898 gave a new aspect to the situation. From having been mere consumers, we suddenly became also producers, each of the three groups of tropical islands that fell into our possession having a well-established coffee industry. What this may mean for us may be illustrated by the experience of England and Holland. No sooner had the tea industry in British India and Ceylon been placed on a modern basis than the British public, unconsciously, it would seem, began to train their taste to relish Indian rather than Chinese tea, with the result that Great Britain at this day obtains most of her tea from her East Indian possessions. Practically all the coffee consumed in Holland comes from the Dutch East Indies. It is not unlikely, therefore, that of the \$70,000,000 or thereabouts which we annually send abroad to pay for our coffee an increasing amount will find its way into our insular possessions. Provided that coffee prices are profitable, there is good reason to believe that with a practically limitless market the conditions of coffee culture will soon improve in our insular possessions, resulting in increased prosperity and greater purchasing power of the inhabitants.

In recent years we have been drawing most of our coffee supplies from Brazil (in 1904, 741,759,000 out of the total of 960,879,000 pounds imported). Brazilian coffees are classed as "strong," as distinguished from the "mild" coffees of other regions, including our own insular possessions. In addition to this, they are much cheaper. If, therefore, the United States is to shift its patronage in the matter of coffee in part from the foreign to the home market, it will mean two things: (1) That the taste of the public is to be weaned from strong to mild coffee; (2) that either the mild coffees must become cheaper or the American consumer must spend more. That the public taste can be transformed in the manner suggested has just been illustrated by the conversion of Britain from Chinese to Indian tea. It is further illustrated by the fact that

in some parts of Europe chicory, which at first was added to coffee as an adulterant, is now regarded as an indispensable addition, being even sold separately for that purpose. As regards the price, it is difficult, of course, to make predictions. It is to be noted, however, that the United States has hitherto been regarded as the dumping ground for coffee that could not be sold elsewhere and that this is a condition which the American public are not likely to tolerate much longer. As Mr. Joseph M. Walsh says, in his book entitled "Coffee, Its History, Classification, and Description," Philadelphia, 1894: "It is not too much to state that more than one-half of the beverage which masquerades and is sold under the name of coffee is unworthy of the appellation, and that the majority of the people of this country live and die without ever knowing the true taste of that delicious and exhilarating beverage." A "campaign of education" in this direction is now going on, and it is safe to say that whoever has become familiar with a superior brand will not go back to an inferior if he can help it. The American taste will mostly likely become more exacting rather than the reverse, and this means, of course, an increasing demand for mild coffee, such as our insular possessions are able to furnish.

In view of the public interest in this subject, it has been thought desirable to gather in one statement all the important facts bearing on the coffee industry, so far as they may be gleaned from sources accessible to this Bureau.

The statement is made to embrace, in addition to coffee, the companion beverages, tea and coco, because the production and consumption of the three varies sympathetically.

Historical sketch.

The ordinary coffee plant, *Coffea arabica*, is a native of Abyssinia, and in that country seems to have been cultivated and used as a beverage both in the wild and in the cultivated state from time immemorial. Thence it was carried to Arabia about the beginning of the fifteenth century, and the climate of that region seems to have suited it so well that Mocha came to be considered as its real home. From Arabia it was soon carried to all parts of the Mohammedan world by the Mecca pilgrims, who seem to have been delighted to find in it a happy substitute for the alcoholic beverages forbidden by the Koran. Its fame soon spread to the West. The first authentic mention made of it by a European is probably that of Rauwolf, a German physician and traveler, on his return from a tour through Syria, in 1573. It was brought to Venice by a physician in 1591. It is referred to in 1621 by Burton in his "Anatomy of Melancholy," as follows: "The turks have a drink called coffee, so named from a berry black as soot and as bitter, which they sip up hot because they find by experience that that kind of drink, so used, helpeth digestion and promoteth alacrity." However, it was only in 1652 that the first coffeehouse was established in London. In 1658 it is heard of in Marseille, but it was not till 1689 that it became fashionable in Paris through the popularity of Soliman Aga, chief of the embassy from Mahomet IV to Louis XIV.

Students of English literature and history are familiar with the importance which the coffeehouses almost immediately acquired in London as centers of literary and political discussion, in large measure supplying the place of the newspapers, which were then under rigid censorship. In France the progress of the new beverage was slower but steadier, while England gradually forsook coffee for tea. Though it was sold in Leipzig as early as 1694, the Germans seem to have become extensive coffee drinkers only about the time of the Seven Years' war.

For some time after its introduction into Europe all the coffee came from Arabia. In 1696, however, the Dutch succeeded in growing coffee trees in Java from beans obtained in Malabar, India, and soon the Amsterdam market was filled with the Java product. From the Botanic Garden at Amsterdam a cutting is said to have been surreptitiously conveyed to the Botanic Garden at Paris, where it grew into a vigorous tree. In 1720 a slip from this was intrusted to an officer named Declieux (also spelled Declieux or Ducheux) to take to Martinique. During a long voyage this officer is said to have shared his daily ration of water with the precious plant. From this single slip are said to be derived all the immense plantations of the West Indies and Central and South America, with the exception of the Dutch West Indies, which had been supplied from Amsterdam direct in 1718. For some time the West Indies took the lead in coffee production, from which they have strangely declined. Java eventually outstripped them, to be in turn outstripped by Brazil, where the plant was in-

roduced in 1754 by Father Villaso, a Franciscan monk, who cultivated it in the garden of the monastery of St. Anthony. At present Brazil supplies two-thirds of the world's coffee production. In the Philippines it was introduced in 1740 by Spanish missionaries, who had obtained the beans from Java.

Natural history.

In Asia and Africa many species of the coffee tree grow wild. They constitute a genus of the botanical order *Rubiaceæ* (madder). The French in their Sudanese possessions and the Belgians on the Kongo are making a study of the native varieties of coffee in those countries, of which new ones are constantly discovered, and it is safe to say that some of these will shortly have a decided influence on coffee culture. Wildeman (Les Cafétiers, Brussels, 1901) enumerates 79 species and varieties. Four varieties are cultivated—the Arabian species, *Coffea arabica*; the Peruvian species, *Coffea racemosa*, very similar to the preceding; the Liberian species, *Coffea liberica*; and the African species, *Coffea laurina*. A species of great promise, *Coffea excelsa*, was discovered in the Sudan in 1903 by the French Shari-Chad mission under Auguste Chevalier. It is a tree 45 to 60 feet high and produces a small grain of excellent quality. In Brazil, a variety called maragogipe has been cultivated for some time. It derives its name from the town of Maragogipe, in the State of Bahia, at the head of Bahia Bay, where it was first discovered. The reports regarding it are somewhat contradictory. Rossignon states that it is distinguished by the abundant crop; that the grain is much larger, with polished surface of silky luster and excellent aromatic qualities. It is found on a high plateau, and the planters consider its results so favorable that many have cut down their old plantations to plant maragogipe. An English traveler, cited by Arnold, speaks thus of maragogipe: "Its leaves are much broader than those of the ordinary Arabian coffee. It grows with extraordinary vigor, so much so that trees three or four years old reach a height of 8 to 10 feet and are laden with fruit. They reach their complete development much earlier than the ordinary types, and the bean is much larger. On the other hand, it appears that the weight of coffee produced in a plot planted in maragogipe is much larger than in an equal plot planted in ordinary coffee." The immense plantations of the Old and New World (Brazil alone is estimated to contain 530,000,000 coffee trees) are practically all derived from the specimens taken from Arabia first to India and thence to Java and elsewhere. In recent years a certain degree of attention has also been paid to the Liberian species, which has been found to be immune from various diseases that play havoc with the Arabian species. Its berries are much larger and the yield is more abundant, 2 tons per acre having been gathered from it. Its flavor is also said to be good, and, while some regard it as inferior to that of the Arabian variety, it must be remembered that the latter has been cultivated from time immemorial, while the cultivation of the Liberian species dates back only a few decades.

When one considers the marvelous transformations which the fruit of other plants, such as pears, apples, oranges, strawberries, and tomatoes, have undergone through scientific selection and culture, one may get an inkling of the new development in store for the coffee industry whenever the managers of coffee nurseries shall employ these modern methods. Hitherto this field has been almost entirely neglected. The numerous varieties that seem to have developed spontaneously under cultivation have not yet received scientific treatment. A beginning of such researches, however, has been made in Brazil and Guatemala, and surprising developments may be looked for when some horticultural "wizard" devotes his attention to the coffee tree.

The plant is a handsome evergreen tree, which sometimes reaches a height of 40 feet, but usually is not allowed to grow higher than 8 feet, being cut back to facilitate picking. Its leaves resemble those of the laurel, its flowers are white and exhale a delicious fragrance. The fruit in well-developed trees grows in clusters of a dozen or more. It resembles a cherry in size, form, and appearance, its color when ripe being a deep red like that of a cranberry. On dissection it is found to consist of six different parts: (1) The outer skin, very similar to that of the cherry; (2) a soft pulp adhering to the outer skin; (3) a soft, glutinous substance, strongly saccharine; (4) the parchment, a rather tough, yellowish-white covering, somewhat thicker than the husk of wheat; (5) the silver skin, a thin, whitish film, closely adhering to the beans and entering into their folds; (6) two beans lying with the flat side against each other. These two beans are the valuable part; all the rest is "hull," which is either

thrown away or used as fertilizer, except in Arabia, where the dried pulp is an article of trade, being used to make a decoction called "kishre," resembling tea. Probably, as the profits of the coffee industry diminish, owing to the tendency toward overproduction, the producers will be compelled to use more economical methods of treatment, and it can hardly be doubted that some important use will be found for the "strongly saccharine" pulp of the coffee berry. As a fertilizer the waste is in high esteem, as it contains 85 per cent nitrogen, besides phosphoric acid and phosphates. The effects of it last two or three years.

Geographical distribution.

Coffee is a tropical plant, practically limited in its distribution to the parallels of 25° north and south latitude. Within that belt it grows at all altitudes, up to the line of frost. While it is said to thrive best at an altitude of 1,500 to 3,600 feet above sea level, it has been found in perfect condition at sea level, a fact which seems to indicate that mere altitude has little influence, the real causes of the observed differences being probably moisture, isolation, wind, and soil. A similar remark may be made regarding the question of shade, as will be seen further on. However, there is no doubt as to the superior quality of coffee grown in the mountains, as may be seen at once by a comparison of the different sorts in the market.

In one or other of its varieties, coffee is evidently indigenous to most of Africa. It has repeatedly been maintained that it was indigenous also to Arabia, India, and the Philippines, and even to such New World countries as Peru, Brazil, and Porto Rico. As regards Asia, this statement seems plausible, since birds, which, in addition to mammals, act as its distributors in Africa, might readily have carried it across the Red Sea and the Persian Gulf at an early age, supposing that its center of distribution lay in Africa and not in Asia. As regards the New World, the question is more problematic. The fact that coffee trees are sometimes found in localities not previously tilled or even visited by white men, is no proof that they were not derived from the specimens brought from Europe to America by human agency. The terms "monkey coffee," "jackal coffee," and "tiger-cat coffee," applied to coffee beans that have passed through the intestines of those animals, at once suggest the very rapid distribution which the plant must undergo the moment it is introduced and matures its luscious cherry-like fruit in a country abounding in these four-footed gormands. It is safe to say that if no more than a single coffee tree had ever been planted by the hand of man on the Western Hemisphere, its descendants would within a few centuries be found struggling with the native vegetation throughout tropical America.

The area where coffee is actually grown is evidently very small compared with the area where it might be grown. Even in Brazil, the main coffee-producing country, the coffee lands are mainly concentrated in four rather small States. The natural conditions are probably quite as favorable in the entire northern half of South America, in Central America, one-half of Mexico, three-fourths of Africa, one-half of Nearer and almost the whole of Farther India, New Guinea, and at least one-fourth of Australia. Of course it is not to be expected that in all these countries the industry will assume such proportions as it has in Brazil. If the comparatively small area planted in coffee even now yields an overproduction, it is evident that it will not admit of much greater extension. For every new tract successfully devoted to coffee raising, some less favored tract now planted in coffee will have to be devoted to something else. Only as the consumption increases through increase of population and prosperity can the total coffee area be extended. This consideration must be borne in mind in considering the proposition to raise our own coffee in our insular possessions.

Cultivation.

As may be gathered from what has been said of the geographic distribution of coffee, the plant thrives best in a hot, moist climate, at considerable elevation, in a rich soil. The rainfall should be from 75 to 150 inches per annum, well distributed over all the seasons. The drainage must be good, as the plant languishes in soggy ground. As the taproot is some 30 inches long, the drainage must extend to that depth. Where nature does not provide soil and moisture, fertilizers and irrigation have to take their place. Irrigation is practiced successfully in Arabia and Mexico. It must not be continuous but intermittent, because the air can not easily reach the roots through a water-soaked soil. It is

found that by cutting off the water supply at the time the crop begins to ripen the berries become more perfect and the aroma improves. The need of an abundant and steady supply of water is due to the fact that the roots are mostly superficial, so that a drought quickly deprives the plant of nourishment. An impervious stratum within reach of the taproot is fatal, as no sooner does the taproot reach it than the tree falls off and dies.

In establishing a coffee plantation it is advantageous to select a tract covered with forest or brush which may be burned, contributing to the fertility by its ashes. In default of brush the ordinary weeds may be burned.

The young plants are obtained in three ways: (1) By using the seedlings that grow up spontaneously; (2) by sowing the seeds in nurseries and afterwards transplanting; (3) by sowing them in the places they are to occupy finally.

(1) The first of these three methods is largely followed in Porto Rico, to the great detriment of the industry, as it precludes anything like a selection of good seed, and often tends in the contrary direction, since the berries which are unripe at the time of the harvest or those sparingly produced by unhealthy or unfruitful trees are much more likely to have the opportunity of germinating than good and seasonably ripened seeds. The indefinite repetition of this process of reversed selection can bring about only a deterioration in vigor, fruitfulness, and uniformity of ripening, a fact which makes plain the necessity of the introduction of new stock in all countries where, as in Porto Rico, this objectionable method of propagation has been followed.

(2) Nurseries are in use in regions where there is not sufficient rain throughout the year to keep the young plants alive. Irrigation, therefore, has to be employed, and this is of course easier on the limited area of a nursery. Thoroughly ripe seeds are selected, deprived of pulp, but retaining their parchment. It is the practice to cover them with ashes, to make them easier to handle. In this state they are kept spread out in a covered and well-aired place. From the moment of picking to the time of planting not more than two weeks ought to elapse.

Too great care can not be exercised in the selection of seed. By extra efforts, no doubt, fine trees may be developed from poor seed, but it would certainly be more profitable to spend the same care on the best seeds in order to develop still finer plants. This is a maxim with which the farmers of the Mississippi Valley have long been familiar as regards wheat and corn; it has also been followed with the most gratifying results by the German coffee planters in Guatemala.

Nature's method of distributing the seed—through the droppings of animals that have eaten the berry and digested the pulp—may perhaps suggest an improvement in planting. It has been proved conclusively, in at least one case—that of the poison ivy—that the seed is distinctly benefited, as regards its germinating power and vitality, by passing through the intestines of its distributor, the crow. It seems reasonable to assume that all plants that depend for their distribution on the same agency are similarly benefited thereby. It would certainly seem worth while to ascertain by experiment whether by feeding the coffee berries to animals and planting the beans thus intestinally pulped, the germination of the seed and the growth of the plants might not be hastened and their vigor increased.

For the seed bed a patch of gently sloping virgin soil should be selected, warm and dry, soft in texture, and not richer than that to which the plants are to be subsequently transferred, but close to water—running water if possible. The seed beds must be somewhat shaded, but not so as to exclude the sun entirely nor so that the shading plant may gather rain and send it in streams upon the seed bed. The soil must be dug up to a depth of from 9 to 12 inches and made very friable, and at the same time slightly raised to promote drainage. The best time for planting is the autumnal equinox, which in the Northern Hemisphere is in September, in the Southern Hemisphere in March. The cooler season then approaching prevents the young plants from being scorched by the sun. The seeds are planted at intervals of an inch, in rows 6 to 9 inches apart, and lightly covered with mold. A cheap and effective shading may be secured by laying branches across a light framework of poles. All watering by sprinkling must be done in the morning or toward sunset. The young plants come up in about a month. When they produce from two to four leaves, exclusive of the seed leaves, they are carefully loosened and transferred, in damp, cloudy weather, to the nurseries and planted there from 9 to 12 inches apart.

In selecting a plat for a nursery care should be taken to have such command of water as to enable the soil to be thoroughly saturated. If this object can not

be attained by erecting a tank or diverting a stream, the cheapest plan will be to transport the soil already prepared and lay it down to a depth of 1 foot to 18 inches on any land that has a good command of water. A couple of boys can effectually irrigate a large nursery if the water can be made to flow to each bed, while 20 men will be required to carry water where no such provision has been made. Moreover, the beds may be flooded at any time of the day, while watering pots can not be used except early in the morning or late in the afternoon. However, in flooding care must be taken not to allow the water to remain standing too long. During the hot weather the young plants should be shaded, which may be done by placing posts 4 feet high, with forked heads, at the corner of each bed, long sticks being laid across them from post to post, the whole being covered with grass or other material. Some months before the plants are finally set out this shade should be gradually thinned and finally removed, in order to harden the plants by gradual exposure to sun and air. Shortly before removal the plants should be stinted of water and brought to a standstill, for if they be transplanted with new and tender shoots they run great risk of being nipped off by the scorching rays of the sun.

In about a year,^a or when the plants have attained the height of about 18 inches, they are ready for transfer to their permanent positions on the plantation, which has been meantime prepared for their reception. Here again rigorous selection of none but the best specimens has proved to be the most profitable in the long run. The German planters of Guatemala make it a rule to reject all plants that have not ten branches (*cruces*), no matter how promising they may otherwise appear. So far as possible the block of soil which contains the roots of the plant should be transferred with it without disturbing the roots. In certain model plantations in Brazil, as stated by Dafert, this object is attained by planting the seedlings taken out of the seed beds not in the bare ground, but in bamboo baskets filled with soil and set in trenches. These baskets can afterwards be readily lifted out of the ground and transferred to the holes prepared in the plantation. This method, though expensive at first, is stated by him to be the most economical in the end, as the loss in plants is thereby reduced to less than 1 per cent. Where this is not possible, the block containing the plant (*en pilon* in Spanish) is loosened by four cuts of the spade, lifted out, and transferred with as little shock as possible. Great care must be taken not to double up the roots, and if this is difficult in the case of the tap-root, it is better to cut it short. The holes that are to receive the young trees ought to be prepared before the latter are lifted out of the nursery, so that they may not remain out of the ground longer than necessary. For fifteen to twenty days the transplanted trees are kept covered with brush to protect them against the sun, and the ground is kept covered with leaves to prevent too rapid evaporation. This, in fact, is a requirement to be kept in mind throughout the life of the tree, as the superficial character of the roots renders it very sensitive to drought. Those plants that do not survive the ordeal of transplanting must of course be replaced.

(3) When the seeds are planted in the open field at once, without the intervention of a nursery, it is customary to drive stakes into the ground at regular intervals and to plant several seeds in a hole at the foot of each stake. When the young trees are 12 to 15 inches high, the weaker ones are pulled up and only the strongest one is left standing. It is advisable to perform this operation gradually, pulling up the weakest first and allowing the others to take firm root again before pulling up the next. This method avoids the labor of transplanting, the risk of injury to the roots, and the setback which every plant experiences in being transferred to a new site; but of course it is practicable only where the humidity is sufficient to maintain the life of the young plants without irrigation, even during their tenderest stage.

The distance between the trees varies with the locality. On slopes they are planted closer together than on level ground. Some planters allow 10 feet between the trees, and others still less; others again contend that the interval should be 10 or 12 feet and that they ought to be carefully pruned in order to increase the vigor of the remaining branches and to afford free circulation of air and exposure of leaves and fruit to the sunlight. Where shade trees are not used, the tendency is in the direction of wider planting, 12 to 18 feet being the prevailing distance in Brazil. The *quincunx* arrangement, by which any three

^a Mr. T. P. Welsh states that the coffee trees ought to remain in the nurseries for three years. Doctor Dafert says that in Brazil the unproductive period, which used to be three and a half to four years, has been reduced to one-half.

neighboring trees form an equilateral triangle, is advantageous, in that it permits cultivation in three directions.

In deciding upon the relative desirability of different conditions and methods of culture, it may be found necessary to distinguish carefully between the yield by areas and the yield by individual trees. Thus in some localities thick planting and small returns per tree may bring earlier and larger profits than could be secured by wide planting with the necessary postponement of the maximum yield. If the matter were to be decided entirely on the basis of the yield of individual trees, testimony is well agreed that the most favorable conditions exist at elevations where a mild and equable climate renders shade entirely unnecessary, and a fertile soil sets no limits to growth. Thus in Java the largest trees are described as growing on terraced, carefully cultivated mountain sides with the slopes grassed over to prevent washing. The coffee is here planted 25 feet apart and permitted to grow to its full height, sometimes reaching 30 or 40 feet. These giant trees bore a crop which yielded 6 or 7 pounds of prepared coffee at a time when the general average for the Government plantations of Java was only half a pound per tree. On the rich volcanic soils of Central America similarly favorable conditions permit unusual size and yield to be attained without shade. Averages of 3 pounds per tree and upward have been recorded for unshaded plantations, while individual trees have been reported as yielding 12, 20, and even 40^a pounds of coffee. One writer, who gave special attention to such exceptional cases in Mexico, reports as follows:

"Coffee trees will grow and produce more or less fruit in almost any soil where the temperature is not too low, but in order to obtain the best results it is necessary to select a rich, light, and deep soil in a locality where it rains at brief intervals during the entire year; and yet too much moisture is not good for coffee. Much has been said and written about the altitude above the sea level. My own observation has convinced me that the importance of this point has been greatly overestimated, because I have seen abundant crops of excellent quality produced at a very insignificant elevation, and I have seen the same results obtained at a very considerable elevation above sea level. * * * It is a fact worthy of note that all the coffee trees which I have known to produce very large crops have been permitted to grow freely without pruning the roots or the tree beyond taking off the suckers or sprouts, and they have been so far from any other trees that their branches did not come in contact with them. Some of these very productive trees have received no attention whatever except the gathering of the fruit, but as far as I am able to observe they have been entirely free from contact with other trees. Some of them have grown always in the shade of other trees, others without any shade whatever from other trees. It is very important in planting coffee trees that the roots should not be injured, although in many places it is customary to cut off the taproot at the length of 9 inches, and to cut off the top of the tree, but such treatment is sure to shorten the life of the tree, and hence the prevalence of the belief that the profitable life of a coffee tree does not exceed fifteen to twenty years. Yet I have seen trees heavily laden with fruit which were so old that no one in the vicinity knew when they had begun to bear fruit; but these trees had evidently been neglected."

The question of topping and pruning involves, of course, the same arguments in coffee culture that it does in grapevine culture and in other lines of fruit growing. Uncropped vines may doubtless be seen spread out over a great expanse and laden with grapes, yet no experienced vine grower will attempt to allow his vineyard to grow after that fashion. By experience it has been found that on the space covered by one vine growing without restraint many carefully pruned vines can be made to grow, and that the yield from these is larger and better. Modern coffee growers act on the same principle. Their aim is to direct the entire productive force of the tree, so far as possible, to the growing of fruit, and hence to restrict the formation of mere wood to the bare necessity of support for the fruit. All branches that show no promise of fruit are carefully removed.

"The first result of 'topping' (says Joseph M. Walsh) is to induce the growth of a number of shoots, the removal of which is termed 'handling' or 'searching.' The first to appear are vertical 'suckers' or 'gormandizers' from under the primary boughs; these are immediately rubbed off without injuring the bark. From the primaries spring secondary branches, in pairs, and at very short intervals. All such appearing within 6 inches of the stem are removed at once,

^a Modern Mexico, March, 1899.

so that a passage of at least a foot high is left in the center of the tree for the admission of air and sun. The fruit of the coffee tree is borne by young wood, and as the secondaries are reproduced when they are removed they are cut off as soon as they have borne; a constant succession of young wood is thus secured. In order that this may be regular, and to avoid weakening the shrub, the secondaries that grow outside of the central free space are left on alternate sides of the primary, their opposites being removed each year in turn; thus one is growing while the other is bearing. The one point in view must be the equal development of the tree and the yearly growth of as much wood as will bear fruit, but no more. Branches must not be allowed to grow into or cross each other, and if two or more secondaries spring from one spot the strongest only must be retained. Where a gap occurs tertiary branches may be trained to fill it in the same way. When practicable the trees should be 'handled' twice before the crop, and the pruning should be commenced immediately after the crop and finished before the blossom comes out. When it is evident that a crop on a tree will exhaust it if allowed to mature, a portion of it must be sacrificed by pruning. The loss thus occasioned is more apparent than real, as in every prolific season much fruit is wasted for lack of labor and the trees are unreasonably overtaxed and bear poorly for some time after. Everything should be done to insure regular and even crops; the cuttings should be trenched in among the trees with manure, and no branch should be allowed to bear more than two or three crops before removal. Where coffee plantations have been neglected on this score, they must be very gradually reduced to proper condition by sawing out the branches and opening up the center of the trees in the first year and trimming out about half the remaining wood in the second year."

When a plantation is established on recently cleared land, it is important that all roots be removed and that the soil be frequently stirred, so as to exterminate certain grubs, very injurious to the roots of the coffee trees. It is advisable, for this purpose, in cultivating, to sprinkle the earth with naphthaline or carbon disulphide.

For some time other crops, such as corn and beans, may be raised between the coffee trees. When this is not done the orchard must be weeded two or three times a year, either by tearing up the weeds or cutting them off with a knife. They should not be burned or removed, but spread about the trees, so as to serve as a mulch to keep the ground moist and also eventually to fertilize it by their decay.

After three years a small crop may be gathered, but a full crop can not be expected before the fifth year. Some trees produce less than a pound a year, others 6 to 8 pounds. Though old trees produce less fruit, it is said to be of better quality. When an orchard grows too old it may be renewed by simply cutting down all the old trees and allowing the young shoots from the roots to grow again.

In many countries it is customary to plant in coffee orchards larger trees intended to shade the coffee trees. Whether such shade is beneficial or harmful to the coffee tree is a question still under debate. Nearly all the reports from Porto Rico state that shade is there indispensable. On the other hand, in Brazil, which produces two-thirds of the world's coffee, no shade is used. The question has been well treated by Mr. O. F. Cook, special agent of the Department of Agriculture ("Shade in Coffee Culture," Bulletin No. 25, Division of Botany). As regards quantity of yield, he finds that individual trees produce most abundantly without shade. As to quality, the production without shade of Mocha coffee and the now equally prized Blue Mountain coffee of Jamaica, to say nothing of other high grades of East Indian and Brazilian coffees, shows that the claim that shade is a necessity to the production of coffee of good quality is not to be taken seriously. He thus arrives at the conclusion that any benefits which the so-called shade trees may confer are probably indirect, namely: (1) Protection against drought; (2) protection against erosion; (3) shelter from wind; (4) fertilization of soil by fallen leaves; (5) nitrification of soil by root tubercles of leguminous trees. He suggests that all these effects (except protection from wind) might perhaps be attained without the injurious effect of shade by the use of some leguminous plant which, like the Florida beggar weed in the orange groves, will keep down the grass and add fertility to the soil.

The German planters in Guatemala, whose plantations are regarded as models of scientific management, have arrived at the conclusion that above 3,500 or 4,000 feet (depending on local conditions) shade is not beneficial, but that below that altitude it is indispensable.

The trees most commonly used for shade are the bucare (*Erythrina*) and the guamo (*Inga*). The former is chosen for its rapid growth, and because it sheds its leaves about the time for gathering the crop; but its shade is rather too dense and the brittleness of its wood causes it to offer little resistance to the wind. The guamo is of slower growth, but is less liable to injury by hurricanes.

F. J. Madriz, writing of Venezuela, says that shade is necessary in hot land to prolong the life of the tree and to sustain it during the long drought from October to April or May, five or seven months, when plants with superficial roots suffer severely. He recommends the bucare, or fire tree (so called from its abundant red flowers), especially because it sheds its leaves just at the time of flowering, in March, so that the flowers have the benefit of sunlight. Its leaves are also good fertilizers, beginning to decay as soon as they reach the ground. By covering the ground they prevent evaporation during the time from flower to fruit.

Bananas and plantains are planted very generally with coffee. In some regions they are employed for the temporary protection of the young plants while the permanent shade trees are still small, but it is also customary in parts of Mexico and Central America to maintain bananas throughout the life of the coffee, with or without other shade. In the extremely rich and deep volcanic soils of Central America this system may be permissible, but under ordinary conditions it is probable that the banana is not a desirable shade plant, and many intelligent writers emphatically condemn it as exerting a distinctly harmful competition with the coffee. Mr. T. P. Welsh, who spent considerable time in Mexico, states that no first-class planter in that country would think of planting bananas among his coffee trees. Analyses in Venezuela, reported by Doctor Delgado, indicate that from a given area planted to bananas or plantains the fertilizing materials annually drawn from the soil are nearly twenty times those required for coffee in full bearing, and it is accordingly claimed that secondary shade by means of bananas should not be employed, even for a few years, since it hinders the growth of the young trees and induces a debility from which they never fully recover. In Porto Rico many plantations are smothered with bananas to an extent obviously harmful, the young seedlings having opportunities for only the most spindling and weakly existence and requiring many years to attain even to the meager fertility with which their owners seemed to be satisfied.

The popularity of bananas as shade for coffee is probably largely due to the value of the fruit, which, even though produced incidentally and not exported, furnish an important part of the food of the laboring population in Porto Rico and other coffee-producing regions.

In such regions many peasants and small farmers derive a large part of their subsistence from the bananas, while the small amount of coffee obtainable is still sufficient to supply their slender needs in the way of imported articles. The culture may be a success from their standpoint, but this is no indication that the method is adapted to commercial production which will yield a profit after the expenses of hired labor and management have been covered.

It may be added that as a shade tree the banana is also objectionable because, unless planted so thickly as to smother the coffee, a part of the latter is exposed while the remainder is too densely shaded. The tall varieties are also liable to be blown down in heavy winds and often fall upon and injure the coffee trees. The large leaves may also keep the rain off some trees while pouring torrents upon others.

In Porto Rico bananas are often planted indiscriminately among the coffee, though some planters arrange them in alternate rows. This is altogether too close to permit a normal growth of the coffee, which never attains proper stature or productiveness. In Mexico and Central America it is customary to run from two to six rows of coffee between the rows of bananas. The middle rows of coffee under this arrangement are but little shaded, and the trees are larger and more fertile than those which stand nearer to the bananas, showing that the effects of the latter, if not negative entirely, are confined to the general protection against wind and drought.

If for any reason the planting of bananas with or near coffee is found to be desirable, the utility of the dead stems and leaves as manure should not be overlooked. These may be used as a mulch. The so-called "trunk" is in reality a bundle of the sheathing bases of the succulent, herbaceous leaves, and retains its moisture for a long time, usually until thoroughly decomposed.

According to Gomez, it is customary to bury the stems and leaves of the banana about coffee trees in the vicinity of Uruapan, in the State of Michoacan, Mexico. These may also be collected and allowed to decompose in trenches or piles, and with proper handling are said to yield a manure rich in nitrogen, potash, lime, and phosphoric acid, and thus particularly valuable for coffee.

A Queensland experimenter claims good results from the planting of rice for shading the young coffee and protecting it from the wind. The rice paid nearly all the expenses of preparing the land and planting the coffee. After removing the grain the straw was used as a mulch and the coffee is said not to have suffered but to have been advantaged by the rice, the growing of which also helps to keep down the weeds.

The coffee plant is subject to various diseases. The most destructive is that caused by *Hemileia vastatrix*, a microscopic fungus which at one time nearly ruined the coffee plantations of Ceylon, where it first became noticeable in 1870. It has also made its appearance in Java and elsewhere. It attacks the leaves, producing yellow stains, soon turning black. Under the microscope these stains are seen to be covered with an orange-colored powder, which readily drops off. The stains gradually enlarge until they occupy the entire leaf, which then shrinks and falls off. The extremities of the stems then die and the berries fall off. Generally the plant puts forth a new set of leaves, but if these are again attacked and destroyed, the plant rarely survives. It appears that the fungus had long ago been observed in Ceylon and Sumatra, but without doing much harm. Some unusual combination of circumstances seems from time to time to lend it special virulence, when it nearly ruins the plantations. Sulphur fumigation and acids have been tried without satisfactory results. The fact that it attacks plants in exposed situations and on dry soil, while it spares those in sheltered places and moist soil gives color to the theory that the best preventive is to keep the plant in prime state of growth by abundant irrigation and manure.

Another enemy of the coffee plant is the leaf-miner (*Cemistoma coffeellum*) of Jamaica, Porto Rico, and elsewhere in America. In Brazil the injury done by this pest is said to have amounted to one-fifth of the coffee crop. The unwelcome creature is a small moth, whose minute, almost microscopic larva burrows in the middle layer or soft tissue of the leaf, leaving the upper and lower surfaces uninjured, except that the cells die and form large, irregular brown spots, having exactly the appearance of vegetation scorched and shriveled by heat. The insect appears not to attack the Liberian coffee. One way to exterminate it is to pick off and burn all the diseased leaves before the escape of the larvæ, but this of course is very tedious. Care should be taken not to allow the pest to be introduced.

Dressing for market.

The coffee berries ought not to be gathered until they have assumed a dark-red color, verging on brown. If gathered at an earlier stage, when they are bright red, the aroma is less rich. This is apt to be the result when the picking is done by the job, as the pickers are then anxious to fill their baskets as quickly as possible, and take ripe and unripe berries indiscriminately. In up-to-date plantations the berries are conveyed to the curing house by running water in galvanized-iron spouting.

In Arabia it is said to be the custom to shake the trees so as to cause the fruit to fall on cotton sheets spread beneath. In this way only mature fruit is harvested.

Before it can be sold the coffee has to be freed from the various envelopes that surround the two beans. This is done in two ways, the dry and the wet.

(1) The dry way is the old way, in use in Arabia and in some parts of America, where the planters are too poor to use improved machinery. The berries are exposed to the sun's rays in layers 5 or 6 inches deep on platforms or terraced floors, called "barbecues." These paved barbecues are raised a little above the ground and inclosed with an upright stone ledge 8 or 10 inches in height, and divided by transverse partitions, with four or more square compartments, that each may contain a day's gathering. During the first and second days the berries are turned often that the whole may be more exposed to the sun, but when they begin to dry they are frequently winnowed and laid on cloths to preserve them better from rains and dews, still exposing them to the sun daily and removing them under cover every evening until they are

sufficiently dried. By this means the pulp ferments in a few days, and having thus thrown off a strong acidulous moisture, dries gradually in about three weeks; the husks are afterwards separated from the seeds in a mill. The Arabs do not remove the dried pulp before eighteen months, and, as previously noted, use it to make a beverage.

Although sun-dried coffee is really the best, the conditions in tropical countries are such that sun drying is inapplicable to large quantities. The progress of the industry is inevitably in the direction of machine-dried coffee.

The natives of Ceylon pound the dried berries in a mortar to free them from their coverings. This primitive method, by which many beans are broken, has almost everywhere else been replaced by machines called hullers, in which the dried berry is "threshed."

(2) The wet way, or "West India preparation," is the modern method in use on all the improved plantations. It effects the removal of the pulp by washing and maceration. The berries are first thrown into a vat filled with water, the lighter and worthless berries floating on the water and being constantly removed, while the heavier berries at the bottom are drawn off through a pipe and carried to the pulper (despolpador). In this machine an iron cylinder set with teeth faces a curved sheet of metal, which the teeth strike as the cylinder revolves. A stream of water carries the berries between the cylinder and this sheet, where they are crushed and the pulp loosened and the two beans of each berry are separated. They are then conveyed to a vat some distance off, the water being kept agitated by a revolving wheel and serving to remove the loosened pulp, which is carried away by the waste water, the beans sinking to the bottom of the vat, from which they are taken to a strainer, which drains off the water.

The berries are now free from pulp, but still covered with the glutinous substance adherent to the parchment. To remove this they are placed in a cistern and allowed to ferment for forty-eight hours. This softens the glutinous substance, which is then removed by washing, leaving the "parchment" exposed. The parchment, as may be remembered, is the outer and tougher of the two pellicles covering each bean. In this condition it is next dried, either in the sun or by artificial heat, on large zinc-covered tables with raised edges, under which steam pipes are run. They are constantly stirred and removed as fast as dried. In this state they are sometimes sold in the market under the name of "parchment coffee" (*café en pergamino*). They are often left purposely in this state for some time, as their quality is thereby improved; but if left too long the silver skin becomes difficult to remove.

To remove the parchment various machines are used, but the principle is essentially the same, consisting of five operations: (a) The beans are crushed in such way as to break the dry parchment, but leave the bean uninjured; (b) a fan blows away the fragments of parchment, leaving the beans; (c) the beans are assorted by sieves and hollow cylinders pierced with holes of different sizes, this operation being necessary for the purpose of uniformity in roasting; (d) they are freed from their last covering, the silver skin, by constant shaking, trituration, and fanning; (e) lastly, they are picked over by hand to make sure that no imperfect specimens or foreign bodies remain. Afterwards the beans are dried again. Some planters say that drying must be continued till the bean resists the pressure of the thumb nail. Much skill is needed to prevent loss of weight from overdrying or loss of color from underdrying.

When freed from all its coverings, the coffee is said to be "in grain" (*en grano* or *en horro*). The spelling *en oro*, occasionally found in reports from Spanish America is probably an orthographic blunder, induced, perhaps, by the yellowish tinge of some varieties of coffee). It is now ready to be put in sacks and sent to the market.

Unroasted coffee is said to improve with age, so much so that the term "Old Government Java," meaning the coffee which the Dutch Government retained for a long time before selling, came to designate the highest quality. The reverse is true of roasted coffee, which quickly loses its aroma. Hence the roasting is delayed, so far as possible, till the last moment before selling to the consumer. The best results are obtained, of course, when coffee can be ground as soon as roasted, and consumed as soon as ground. This, however, would necessitate roasting by the consumer himself, who has neither the skill nor the appliances to secure the best results. If the heat be too great or too long applied the product is burned, losing most of its aroma and acquiring a bitter taste; if the heat be not sufficient or continued long enough the aroma is not sufficiently developed. Thirty seconds too much or too little may mean

a spoiled roast. Owing to this fact the roasting business has been gradually concentrated in the hands of a few firms employing experts, who by long practice are able to conduct the operation so as to develop the qualities of the coffee to the best advantage. The aim is, of course, never to roast more than can be immediately sold and consumed. To some extent the loss of aroma of roasted coffee can be avoided by glazing, which is done by scattering powdered sugar over the hot beans. The sugar melts immediately, giving to each bean a fine glaze, impervious to the atmosphere so long as it is protected from moisture. This protection is secured by storing in tightly closed tins or jars.

As an effect of roasting, coffee loses 12 to 16 per cent in weight, but gains 50 to 60 per cent in bulk. The roasting largely destroys the characteristic outer marks, so that the different varieties are far more difficult to distinguish in the roasted than in the unroasted condition. The main object of roasting is to make the constituents more soluble by the bursting of cells. While raw coffee yields 25 per cent of its matter to solution, roasted coffee yields 39 per cent. By the process of roasting, the beans acquire a remarkable power of absorption, as the consumer but too often learns to his sorrow when he finds that his coffee tastes of petroleum, tar, etc., having absorbed the odors of these substances in the grocery store, sometimes over a considerable distance. This illustrates the need of careful packing of the roasted beans.

[From The Commercial Philippines in 1906, page 17.]

COFFEE.

Coffee is at present an inconsiderable item in the export trade of the Philippine Islands, or, indeed, of their production. Prior to 1890 it was an important and remunerative product of certain provinces and constituted a source of considerable wealth in the sections in which it was cultivated. In 1890 coffee ranked fourth in order of magnitude in the export trade of the islands, and did not fall below tobacco in the value of its exports, having been in 1890 7.4 per cent and in 1889 7.1 per cent of the total exports of the islands. Subsequent to 1890, however, the devastation of the coffee plantations by insects and disease caused a rapid diminution in the quantity produced and exported, but there is reason to believe that the same energy and scientific methods applied by the Dutch in Java to the protection of their coffee from insects and disease and a reestablishment of their coffee area might bring about a large coffee production in the Philippine Islands. The quality of the coffee of the Philippines is stated as especially fine, comparing favorably with that of the comparatively near-by island of Java. Coffee was brought to the islands by Spanish missionaries during the latter part of the eighteenth century, and its systematic cultivation commenced early in the nineteenth century.

The possibility of the reestablishment of this industry in the Philippines is discussed by the Manila Daily Bulletin in its special annual edition of August 5, 1906, in which it says that natural conditions in the Philippine Islands for growing coffee are perfect and unexcelled elsewhere in the world, and notwithstanding the collapse of the islands as coffee producers, the fault is not that of the country but of those engaged in production. Java was, until 1880, it says, the second largest coffee-producing region of the world; then came the same disease as that which a little later swept the coffee plantations of the Philippines as if by fire, and at a single blow struck the production of Java coffee from a surplus of 165,000,000 pounds to barely enough for home consumption. The Dutch planters, interested in the maintenance of their plantations, brought scientific and careful treatment to bear upon the existing conditions of blight by insects and disease, and have so far reestablished their coffee industry that it now reaches an annual output of nearly 40,000,000 pounds and commands the highest prices in the markets of the world. The Dutch producers of coffee in Java solved the problem by planting disease-resisting varieties of coffee, and have largely effected the restoration of their industry without recourse to other and more difficult and serious attempts to hold in check the disease by application of sprays or other methods of this character. Similar methods applied in the Philippines would, it is believed, result in the reestablishment of the coffee industry, while the large area known to be available for successful coffee growing suggests that the Philippine Islands may, with proper attention, be able to produce a considerable share of the 75 to 80 million dollars' worth of coffee imported into the United States each year.

RICE.

[From Census of Philippine Islands, 1903, vol. 4, p. 86.]

The production of rice of many varieties, though greatly lessened as compared with former years, is an important branch of Philippine agriculture. The grain is the principal article of food of nearly the entire native population and is cultivated more or less extensively in all provinces.

In former years its cultivation was and had been from time immemorial the principal industrial occupation of the people. It was the only cultivated crop, as far as can be ascertained, produced by the natives when the islands were first discovered by the Spanish explorer, Magellan, in 1521, and for upward of three centuries subsequent to the establishment of Spanish sovereignty it was the principal product. For many years surplus crops were produced and the grain was exported in large quantities, but as the production of more profitable crops, such as hemp and sugar, increased, the cultivation of rice diminished, and from becoming an article of export it changed to one of importation, as the population and their food requirements increased.

In 1857 import duties on rice were abolished; since then and for some years prior thereto the deficiency in home production has been made good by importation, although small quantities have been occasionally exported.

It may be said that, as a rule, the falling off in the production of rice has not resulted in any great loss to the population, except when resulting from drought or locusts, as that portion of land and labor formerly devoted to its cultivation was subsequently used for the production of more profitable crops.

A clear indication is gained from the above table of the extent to which the islands are dependent upon outside sources for this staple food of the people. In 1878 the value of rice imports was 8.7 per cent of that of all imports; during 1880, 1881, and 1882 considerably smaller quantities were imported, but in 1883 the per cent was 7.7 and in 1884, 15.3 of the total value of imports. In 1889 the percentage had risen to 21.2, after which there was a heavy diminution in the imports, until in 1895 the percentage was only 1.7 of the total. Since American occupation the annual imports of rice have far exceeded those of the preceding years, and in 1902 amounted to over eight and three-quarter millions of dollars and were 26.4 per cent of all imports. The enormous increase since 1898 is largely attributable to the lack of carabao, which have been slain by thousands by the rinderpest, without which the natives are unable to prepare the ground for the crop; to devastation of the growing crops by locusts; to recurring outbreaks of ladronism, and visitations of cholera, which at different times since 1898 have raged with very fatal results throughout nearly the whole of the archipelago.

Cultivation of Rice.^a

[By Regino Garcia, Bureau of Agriculture.]

Rice is said to be indigenous in southern Australia and in India, to have been under cultivation in India from the earliest times, and to have been introduced into China nearly 3,000 years B. C. Whether it was brought to the Philippines from either of these countries, or whether it is an indigenous plant, is an unsettled question. But whatever its origin, the Spaniards on their arrival found it under cultivation generally, and it is one of the most important products of the islands.

^a This paper was most voluminous, and in order to adapt it to the general character of the census report it was necessary to condense it.—*Director*.

Although deficient in nourishing qualities, as compared with some other articles of food, its great digestibility and palatability render it very valuable, especially in the Tropics, where it constitutes the principal article of food of millions of people.

There are many species of rice, which are commonly divided into two general groups and known as lowland, or irrigated-land rice, and upland, or mountain rice. The scientific division made by botanists includes many species, varieties, and subvarieties. Repeated experiments made between 1867 and 1873 in the botanical gardens, Manila, threw much light on the various species, varieties, and subvarieties of rice in the Philippines, and the names by which they are known in the different provinces.

Of the 152 kinds which have been recognized, the following are the more important:

Irrigated, or lowland rice.—*Macan, macan sulucan, macan bunut, macan sulung, macan munti, macan sonson, macan bocaue, malagquit puti, malagquit pula, mangasa, mangasalit, pinorsigue, binanbang, pitruritor, ganados, bodlising, binanquero, binsolores, dimulong, sinanpablo, etc.*

Unirrigated, or upland rice.—*Pinursigui, guinarayon, lactansangle, pinurutum haba, pinitod, guinamqig, binusist, mangasi puti, mangasa-pula, pinagocpoc, guinanda pula, guinanda puti, bolibot, dinumoro, quiriquiri, binolitt, quinabibi, dinulong puti, buntodcabayo, tinuma, magapilay pula, mangola, tanqui, aguyot, agap, pinorsigui tapoyoc, bolalague, castano, quinastila, sinantol, tinumbaga, quinaaco, quinandila, quinastilla-malit, quinanpilan, sinanpaga, calivo, manunbalay, inoropol inopot-ibon, pinuray, quinalabac, etc.*

Of the total number collected in the Philippines about 35 are varieties and the remainder may be regarded as subvarieties.

Heat and moisture are prime essentials in the cultivation of rice, which thrives in all southern countries and grows even as far north as latitude 45°. Its cultivation is carried on in the Philippines at elevations of 5,000 feet, as in the mountains of Benguet and other parts of the Igorrote country.

While rice under careful cultivation will grow on any soil adapted to other cereals, a moist, sandy loam is most suitable.

Cultivation consists in the preparation of the soil and the subsequent planting and care of the growing crop.

These operations differ somewhat according as the rice is lowland or upland. The former is practically grown under water supplied by irrigation, while the latter is cultivated on the hills and mountains where irrigation is often impossible and the plants must depend on the annual rainfall for the necessary moisture.

In either case the preparation of the soil consists in clearing the ground of trees, brush, etc., which are used as fencing, and in constructing a sufficient number of earthen dikes or ridges to control the water of irrigation or the rainfall. Where the fields are irrigated an intake and outlet enables the operator to regulate the depth of the water, as well as the flow, which should be constant so as to avoid stagnant pools of long standing.

Lowland rice is grown under water, the plants being raised in seed beds. The ground for the beds is turned over two or three times with a plow in 10 or 15 centimeters of water, until the bed is very well formed.

The seed is then soaked in water for twenty-four hours and sown broadcast, but very thickly.

When the plants begin to grow, it is customary to sprinkle them with a solution of lime to protect them against insects, and when they have attained a height of from 26 to 38 centimeters they are transplanted in the ground previously prepared for the purpose, care being taken that the roots of the plants be exposed to the action of the air for the shortest period possible.

The preparation of the soil for lowland rice consists in working it with a plow, when it is thoroughly saturated with water, being covered by at least 10 centimeters thereof. A harrow is passed over it to level the ground, mixing it with water, and forming a muddy mass. The working is repeated in an opposite direction, with colters in narrow furrows, in order that the soil may form a mass thoroughly soaked with water, the harrow being passed over it once more before the transplanting takes place.

In places where the soil is not of a moist character, artificial irrigation is absolutely necessary.

The field is kept under water until inflorescence appears, the land being flooded every three or four days in order to keep the plants always fresh. When

they blossom and the fruit heads, irrigation is suspended and the ground left dry, in order to hasten the ripening of the fruit.

About 135 pounds of unhulled rice are necessary for a hectare of land. It is necessary to remove the weeds growing in the rice fields, which is done by turning them under into the mud, where they rot very quickly and contribute thus to the richness of the soil.

The preparation of the soil for upland rice consists in plowing the ground during the first rains, harrowing or crushing it and raking off all refuse. After it has been exposed for a few days it is plowed again, and if necessary it is given a third plowing. As soon as the rainy season is well on in the locality, the unhulled rice is sown broadcast, care being taken to scatter it evenly.

Another method of planting, called *catanguines*, is resorted to and consists in dropping from three to five grains of unhulled rice in small, shallow holes about the width of a hand apart. The operation is described as follows: About the first rain many people gather in the field with long bamboo poles, the small end bent with a sharpened piece of bamboo firmly fastened to it. This tool is held almost vertical and with bent part forward. When it is brought down the spring of the bend helps to raise it again and also to throw out some dirt, thus leaving a small hole in the ground in which the women and children drop the seed rice and cover it. The bamboo pole is kept going rapidly and as the top end is split, every time it is brought down the split pieces come together with a loud noise amid the shouts of the people. It seems more like play than work and can be heard for miles around. For planting of this kind one chupa of rice is needed for every square meter of ground.

Before planting, all kinds of rice should be soaked in lukewarm water for twenty-four hours to facilitate the swelling of the cotyledons and assist germination.

The crops of early rice having been sown in May, at the beginning of the rainy season, are harvested between August and January, according to the kind of rice, the spikes being cut when they have attained a length of 50 centimeters.

They are then tied in bunches and allowed to remain on the field until dry, when they are gathered.

Lowland rice is also sown in May, when the lakes and streams are bank full and irrigation made easy. It is harvested not later than October.

Immediately after the harvest the ground is again prepared for a second planting, not later than January, according to the kind of seed. Rice requires from three to four months to bring it to maturity.

Where mills are not to be had for thrashing, the stalks are thrown on a bamboo mat of sufficient size and trampled and turned with the feet until the grains have become completely separated from the stalks and hulls. The straw is then removed and the grain is fanned in order to remove the particles of peduncle and calyx, leaving only the well-ripened grains. In the warehouses, where rice is cleaned for the market, a mill and fan are used.

After rice has been fanned it is placed in a wooden mortar and pounded in order to remove the fine chaff, called in the Philippines *binlig*, and used as food for hogs and horses.

The pounding is done with heavy wooden pestles, which can be easily handled in the mortar, or by large wooden mallets which, with moderate blows, leave the rice very clean and lustrous.

After pounding, the rice and chaff are separated by sifting through large shallow baskets with a small bamboo edge and bottom.

Two cavans of unhulled rice will yield 1 cavan of cleaned rice, or 1 cavan of ordinary rice and 4 gantas of *binlig*, which, at 6 pesos for the former and 40 cents for the latter, give a total of \$6.40. The cost of cleaning rice is 70 cents, and, supposing the cost of transportation to market to be 25 cents, the owner makes a profit of \$5.70 per cavan of rice.

The rice mill in Binan, in the province of La Laguna, charged 28 cents for cleaning 2 cavans of rice, which yield 1 cavan of cleaned rice.

The rice mills of Bautista (Pangasinan) and of Calumpit (Bulacan) clean from 400 to 500 cavans per day.

Among the enemies of the rice plant which cause much damage are very small coleoptera, whitish or reddish, which generate in the soil when it is perfectly dry, and, perching upon the plants, leave them drooping and yellowish, preventing their perfect development. There are also some greenish worms which devour the entire leaf, and a bug which, when fully developed, hops about on the stalks and destroys the stamens, with the result that many of them fall to fruit, though the husks may be developed fully. A remedy against

the first named, if the land be subject to irrigation, is to flood it thoroughly in order to exterminate them, or to irrigate with water containing a solution of lime, which also will exterminate the worm. In the case of the bug, bonfires are made on the embankments at night, and are quite efficacious, as the insects are attracted by the light and are burned up.

Birds called *mayas*, which usually come in large flocks, cause much damage to the rice stalks while they are fruiting. Field scarecrows are a good protection against them.

The greatest enemy to most of the gramineous plants are the locusts, and no amount of precaution or of active campaigning adequately protects the plants against these pests. The methods employed at the present time for the extermination of the locusts may be included in two groups, viz, those which are intended to prevent the development of the egg, and, secondly, those which tend to destroy the perfect insect or the larvæ. One of the methods employed to prevent the hatching of the eggs consists in plowing the land in which they are deposited, not only because the plow destroys a large number of them, but also because they are brought to or near the surface, where they may be easily exterminated by the use of barnyard fowl or hogs, which eat them with great relish. Of course this is done before planting.

In order to kill the locusts while in the grasshopper stage the fields are sometimes surrounded with a number of men who close in toward the center, beating upon the ground with branches, sticks, or other suitable implements until the insects have been completely exterminated. Large rackets may also be used, but they should be thoroughly beaten before being used again.

Another method is to light bonfires and make a great noise with bells, kettles, and other objects, all the inhabitants of the town gathering where this devastating insect appears.^a

AMOUNT OF THE CROPS.

The principal rice-producing islands and provinces in the Philippines are Pangasinan, Nueva Ecija, Pampanga, Tarlac (northern part), southern part of Zambales, Bulacan, Cavite, La Laguna, Batangas, Camarines Sur (the greatest producer in southern Luzon), the Visayan Islands, Capiz (island of Panay), and Negros. Other islands and provinces of the archipelago cultivate rice, but only for local consumption, and a few supply themselves from neighboring provinces, especially from Manila.

The province of Pangasinan until 1868 exported large quantities of rice to China, and considerable shipments left Manila for the neighboring colonies. Until the year 1874 the value of a cavan of rice in Camarines, Pangasinan, the high towns of the provinces of Tarlac, Nueva Ecija, and southern Zambales was from 2 to 2½ pesos, according to class. Even in the year 1899 rice sold in Pangasinan at 2 pesos Mexican per cavan, and the mills in Bautista and Calumpit had their granaries and warehouses overflowing with bunches of unhulled rice and many thousands of sacks of cleaned rice. There were years when the crop was so abundant that there was not sufficient labor to carry it from the field, even though each laborer was given one-third of the amount which he could cut per day, and the rice was abandoned in the fields for lack of labor. This has occurred in the extensive fields of the province of Ambos Camarines, which at the present time is paying exorbitant prices for rice, and also on the plains of the Poponto, between Pangasinan and Tarlac.

In the irrigated lands of the province of Pangasinan, 80 cavans of rice may be gathered from 1 cavan of seed; in dry lands, 50; and in highlands of the third class, at least 40 to 60.

The most fertile farm of the Philippines is that of Imus (Cavite), of which 13,442 hectares are devoted to rice cultivation, and its soil is of the best known, with good irrigation canals, for which reason the crops give excellent yields. It has an area of 18,000 hectares, having 4,480 of the first class, each one yielding an average of 100 cavans of rice per cavan of seed; 4,480 of the second class, yielding approximately 75 for 1; and 4,482 of the third, with a yield of 50 for 1. There remains, furthermore, 4,558 hectares, of which one-half are suitable for upland rice, and would yield from 30 to 60 cavans for every cavan of seed, according to the present condition of fertility. The plantations of San

^a These and all other methods appear to have failed during the last plague of locusts, which totally destroyed the crops in many localities.—*Director*.

Francisco de Malabon, Nalc, and Santa Cruz de Malabon, of the same province, are also productive.

The rice plantations in the province of Bulacan, and the towns of southern Pampanga, and of Rizal, yield, according to class of soil and irrigation, from 25 to 40 cavans of rice per cavan of seed. Some of the land is exhausted on account of the constant cultivation; nevertheless, some of the fields in the municipalities of central Luzon, which are frequently watered by the great overflow of the rivers, usually yield 60 cavans of rice for 1 of seed.

In the province of Batangas the irrigated land yields from 30 to 40 cavans of rice to 1 of seed, and the uplands from 15 to 30 for 1 of seed.

The irrigated rice land of the province of Ambos Camarines yielded from 60 to 100 cavans for 1 of seed, and the dry lands from 30 to 50.

In the province of La Laguna there are lands which yield 80 cavans for 1 of seed, even though their method of irrigation is very primitive. This is due to the fact that the soil here is very suitable for the cultivation of rice. On the other hand, at a short distance therefrom, on the Calamba plantation, which has good irrigation canals, the yield is only 60 cavans for 1 of seed in 2 crops—that is, 35 in the first and 25 in the second—for the reason that the soil is quite sandy and more suitable for growing sugar cane.

In the municipalities of the vast plain in the southern part of the province of Zambales the land most suitable for the planting of rice will yield as much as 50 cavans for 1 of seed, and in other lands more sandy only 25 cavans for 1 of seed.

In Pampanga, where the greater part of the soil is quite sandy, notwithstanding the fact that the rice fields are favored by the rains, the yield is only from 20 to 25 cavans for 1 of seed.

In the island of Mindoro the irrigated land yields from 30 to 40 cavans, and in the dry lands, commonly called *Calanan*, as much as 70 cavans are harvested.

The classes of rice cultivated in the province of Cavite are the following: *Daliquit*, *pulan-balat*, *kuinambic*, and *binaba*, the last two being glutinous, commonly called *malagquit*. These four classes are early varieties, which are sown broadcast during the first rains of May and harvested in the middle of September, as is also the variety called *quinanga*.

The other later varieties of dry-land rice which are harvested in October are the following: *Quinastila*, *quinamalic*, *quinarayon*, *binocaue*, *binolong*, *inabac*, *calimbín*, *pinalapa*, *dinalaba*, *binaguntao*, *inanot*, *sinaba*, *mimis*, and the glutinous *piroroton-dila*, *macabunot-dila*, and the *malagquit*, called *matpunit*.

The irrigated land varieties harvested in December are those called *macan pino*, *macan laque*, *macsalec*, *quiriri*, *malagquit-dinolores-morado*, and the much desired *binanquero*, which is the rice which can be stored in a warehouse for five years while the others can hardly be kept two.

The varieties of rice in the provinces of Bulacan, Batangas, and Ambos Camarines have already been cited, as have also some cultivated in Cavite.

The varieties of rice in the provinces of Pangasinan, northern Nueva Ecija, and northern Tarlac, are called: *Ganado*, *ambalang*, *ganado ampote*, *matayosa*, *galaygay*, *macabontoc*, *sagat*, *bilibisin*, *inomatís*, *mimis*, *obanang*, *simpolet*, *inandusa*, *caviteña-paaga*, *pinila*, *binolaney*, *botoleno*, *pinella*, *dinominga*, *damasco*, *asingan*, *inanteresa*, *sinan Jose*, *bandig-goden*, *inagamang*, *mantica*, *mantica ampote*, and *mantica arem*, and the glutinous varieties *malis*, *bato*, *dinagupan*, *pogot*, *calisibon*, *sinotla*, *malisitín*, and *nilanca*, most of which come from Ilocos and are bearded varieties.

There are also many varieties of rice in the southern part of the province of Zambales. They are the following: *Bulagsac*, *sinanglay*, *panay*, *cumabibi*, *dinorado*, *bacayab*, *binondac*, *quinolapo*, *pinosigui*, and the fragrant varieties *quinapitan*, *quinolantro*, all of which are early varieties. *Inocupa* is a glutinous rice, also early, as are the bearded varieties called *lampangan* and *mamreng*. There are others which are harvested later called *binarít*, *ipót*, and *tayaring*, which are sometimes sown broadcast and at other times in seed beds for transplanting, and the Ilocano varieties, *caviteño*, *mantica*, *salayusay*, *mimis*, *inanduran*, *daldal*, and *sampirit*, and the late irrigated land varieties, *macan* and *binucaui*, which is as fine as the *mimis*, and the bearded *balayan-manticalay*.

In closing it may be said that the main hope of the farmer in planting is to reap a good crop, and consequently he must avail himself of all the means within his power to that end, such as the preparation of the soil, the selection of good seed, the care of the plants, and, above all, that there be no lack of water for irrigation, especially in sandy soil, where there is constant filtration.

COST OF PLANTING AND HARVESTING.

The custom existing in the Philippines in the cultivation of various agricultural products, including rice, when a partnership is formed or laborers are hired, is to make an agreement by which the latter usually takes one-half the crop or its value, after all expenses have been deducted, either in kind or money.

Up to 1896 the principal expenses which the owners of rice fields were obliged to defray were the following, per hectare, in local currency, the Mexican dollar:

For wages for plowing, weeding, etc.....	\$2. 00
For planting.....	5. 00
For taking the sheaves of rice to the stack (mandala) and hulling.....	2. 50
Total	9. 50

For the cutting it is customary to give the cutters, according to their needs, a fourth or fifth of the number of sheaves, according to size, cut per day.

If a contract be made for cutting the rice, it is customary to pay \$0.50 to \$0.75 per thousand bundles, of which the first yield is 2 chupas of unhulled rice and the second 4 chupas.

In other provinces contracts have been made to pay 3 pesos per hectare of land for preparing the ground suitably for the planting of rice and 1 cavan of seed and 6 pesos per hectare for harvesting.

At the present time, wages being high, it is thought that for preparing the land, sowing, and transplanting the rice the cost would be 15 pesos per hectare, more or less, and the cutting according to agreement and as may suit the grower.

These expenses vary according to the different provinces and the scarcity of labor.

Rice is very largely consumed in Great Britain, nearly 330,000 tons, valued at 2,690,000 pounds sterling, being imported into England in 1889.

The colony of Victoria (Australia) imported 5,738 tons, valued at 80,997 pounds sterling, during 1887. The exports from British India during 1886 have been valued at 9,000,000 pounds sterling, according to Dr. G. Watt. The sweet rice, called *ame* in Japan, constitutes a delicacy, as do all kinds of glutinous rice, called *malagquit* and *pirurutom* in the Philippines.

At the present time the rice annually imported into the Philippine Islands amounts to 375,784,891 pounds, representing the large sum of \$4,178,921 gold, while but twenty years ago, more or less, rice was exported from the Philippines to neighboring colonies.

Cultivation of rice in Pampanga Province.

[By M. Cunanan, Pampanga.]

The cultivation of rice is more advanced in Pampanga, relatively, than in the other provinces of the archipelago. The life of the population depends upon its cultivation, being, as it is, its principal food. It is not meant to convey the idea hereby, however, that at the present time the cultivation of rice is at its highest state, because none of the modern agricultural machines is in use here, such as the drill, which dispenses with so much manual labor, or the reaper, which cuts and gathers the harvest so rapidly, or the thresher. Indeed none of the improvements used in agriculture, and which are real evidences of progress, are employed.

The following varieties cultivated in this province may be selected from the large number of known varieties of this plant, and are divided into two classes: (1) *Dinalaga*, *quirinrin*, *milagrosa*, *mimis*, *dinala*, *gangpulut*, *macapungul*, *ynatsupal*, *sinampaga*, *lacatan*, and *quinulantro*; (2) *sinanpablo*, *binumduc*, *pilingbelto*, *matavia*, *inaplaya*, *macanpina*, *palacaya*, *calibo*, *pinulsigui*, *panc*, and *quinuayan*. These two principal groups represent the irrigated and unirrigated rice or lowland and upland classes.

The varieties mentioned in the first group are cultivated in localities where there is neither artificial irrigation nor natural irrigation produced by periodical inundations. This quality of rice requires much less care than the varieties of the second group. A very moist soil is essential; that is, a soil which has been inundated at least for a part of the year, but on the other hand

is subject to the changes in the season. The seed is sown broadcast upon the ground, which has been suitably plowed and harrowed.

The varieties of the second group are sown in the same manner as those of the first group, with the exception that they are generally placed in seed beds, whence they are transplanted in the respective fields, which must be plowed and harrowed until they are converted into a species of marsh or muddy swamp. The preparation of ground for the cultivation of this rice consists in making squares of different sizes, which are formed by heaping up the earth in small dikes. After this has been done the soil is plowed and harrowed with a harrow composed of thorny bamboo called *balsa*. After the ground has been harrowed the square is filled with water and the transplanting takes place from the seed beds. The latter are similar to rice paddies. Planting begins early in June, and after it has been done no work or care is necessary but to keep the paddies covered with water in order to secure abundant crops. The harvest begins, as a rule, early in December and is gathered with a sickle the same as wheat.

Two crops a year are harvested from irrigated lands in some sections of Pampanga. For the first crop the seed beds are prepared in February and March, transplanting takes place in April, and the crop is harvested in September. For the second crop the seed beds are prepared in August, transplanting is done in October, and the crop is gathered in February. After the first crop has been removed, one month is allowed to pass, during which the ground is cultivated before transplanting the second crop. It should be stated that the seed bed consists of a small section of land one-twentieth or one-thirtieth the size of the field in which the transplanting is done.

THRESHING.

When cut, the heads are left in the fields for some days, and are then gathered into sheaves and removed to the threshing place. Usually the threshing is effected by means of mares or carabao; otherwise two stakes are planted upright and joined by a piece of bamboo for support, and the grain threshed out with the naked feet. After the grain is threshed and the chaff separated, the latter is saved and fed to stock. When the grain is free from the chaff it is stored in granaries (usually constructed of bamboo and nipa, although there are many of stone and lumber). The rice crop in Pampanga in normal years has amounted to 1,800,000 cavans.

The price of unhulled rice at the place of production is from \$0.75 Mexican to \$1 per cavan (75 liters), and for hulled rice from \$1.75 to \$2 Mexican per cavan in normal times. The cost of cultivating 1 hectare of land, sown broadcast, is about \$41; planted from seed, \$49 Mexican.

The dry lands yield a more substantial and finer flavored rice, but the yield is less certain and less abundant.

[Farmers' Bulletin No. 3.]

MODERN RICE CULTURE.

By WILFRED J. BOUDREAU.

LETTER OF TRANSMITTAL.

BUREAU OF AGRICULTURE,
Manila, P. I., August 15, 1902.

SIR: I have the honor to transmit herewith for publication as a bulletin of this bureau a manuscript on modern methods of rice culture.

Rice as an article of food occupies the same position in the Philippines that wheat does in America and Europe, and it is eminently proper, therefore, that its culture should receive considerable attention from this bureau. Especially is this the case when we take into consideration the fact that 375,784,891 pounds are annually imported into these islands, representing an aggregate of \$4,178,912 gold, and that this sum of money could easily be kept in this country for its industrial development if rational, up-to-date systems of rice culture were introduced.

Respectfully,

WILFRED J. BOUDREAU,
In Charge of Rice and Cane Investigations.

F. LAMSON-SCRIBNER,
Chief of Bureau of Agriculture.

INTRODUCTION.

The cultivation of rice in the Philippines is in many respects similar to that practiced in China, Japan, India, and other oriental countries. It is true that plows are more generally used here than in these latter countries, but they are such primitive affairs and the work performed with them is so unsatisfactory that, economically considered, they are of very little more value than the mattock and the spade. The main operations, however, such as preparing the seed beds, transplanting, puddling the soil, and harvesting the crop all conform to the oriental type and are such as characterize all countries where labor is cheap.

So cheap is labor in some of these countries that a man's wages for one year are \$15 gold and board. Consequently a farmer has very little inducement to invest money in labor-saving machinery, and it is questionable whether it would be advisable or even practicable, to make a radical change in the rice culture of China and Japan. Most of the lands suitable for rice growing are already utilized for that purpose, and so dense are the populations that it would be next to impossible in these countries to produce sufficient food to maintain the present inhabitants and the necessary draft animals if modern farm machinery were introduced. Besides, the use of labor-saving machinery would result in throwing a large portion of the people out of employment and thus entail widespread suffering and hardship. In addition to this it may be said that the fields are not properly laid out for the use of modern agricultural

FOOTNOTE.—The following illustrations accompanying this report are on file in the War Department: Fig. 1, a light steel-beam plow; fig. 2, a heavy wooden-beam plow; fig. 3, a two-furrow gang plow; fig. 4, a three-furrow gang plow; fig. 5, a disk harrow; fig. 6, a spring-tooth harrow; fig. 7, a smoothing harrow; fig. 8, a rice drill; fig. 9, an ordinary scoop or road scraper; fig. 10, road scraper in operation; fig. 11, rice sickle; fig. 12, cradle for harvesting rice or other grain; fig. 13, reaper and binder for harvesting rice; fig. 14, harvesting rice in Louisiana; fig. 15, thresher; fig. 16, traction engine.

implements. The majority of the fields are small, irregular strips of land, divided from one another by levees, which have been constructed at great cost of time and labor, and before gang plows, disk choppers, and twine binders could be introduced it would be necessary to throw these levees down.

In the Philippines no such obstacles exist. The population is comparatively sparse. In a territory equal in extent to the whole of New England and the State of New York there are only some six or eight million people. The consumption of rice greatly exceeds the production, notwithstanding the fact that there are extensive areas distributed throughout the archipelago which are admirably adapted to the growing of rice. Indeed, the natural conditions for the production of this crop are so favorable that it would not be surprising to see the Philippines become, within the next ten years, one of the leading rice-producing countries of the world.

It was stated above that no obstacles exist to the introduction of a new system of rice culture in this country. We may go further and say that it is absolutely necessary that it should be done. Ever since the occupation of these islands by the American Army four years ago the price of labor has steadily increased, and as American customs are gradually introduced we may look forward to a further advance. It is needless to say that every industry will be profoundly affected by this, and the rice industry will be one of the first to feel its influence, for it is a crop which must be grown cheaply in order to be profitable. To pursue the same system of cultivation as in China, however, and to have to pay three and four times as much for labor is out of the question. Hence the rice farmer will have to adapt himself to the new condition if he wishes to compete successfully with foreign rice, and it is with the view of outlining a new system that this bulletin is published.

Of course it will take time before the methods indicated can be carried out in the remote provinces. There are difficulties to be overcome, chief among which is the question of draft animals, but that a revolution in rice culture is inevitable there can be no doubt, and the sooner it is realized the sooner a beginning will be made.

In concluding these preliminary remarks, a few words might be said with advantage in regard to cheap labor and labor-saving machinery. Cheap labor is by no means the cheapest article on the market. In support of this statement the following figures are submitted: The labor of a Filipino in the rice fields of the Philippines has been estimated at \$20 gold and board per annum. The amount of land which he can cultivate is $2\frac{1}{2}$ acres, yielding 1,500 pounds of paddy. In Texas or Louisiana, on the other hand, a laborer receives \$200 gold and board, but he cultivates 80 acres of land, and the cultivation is so superior that with irrigation water alone he produces 160,000 pounds of paddy. In short, he receives ten times the wages, but he produces one hundred times more rice than the Filipino laborer.

It is not claimed that such results can be obtained in the Philippines. This is a question which can only be definitely settled in the field, and as soon as possible practical work will be undertaken to determine exactly to what extent local conditions may modify the results obtained in Louisiana and Texas.

SOILS SUITABLE FOR RICE GROWING.

Any fairly fertile soil that has sufficient clay to retain the moisture will grow rice. Generally speaking, lands which will produce cane, cotton, and corn will produce rice, and, where a system of rotation is followed in the cultivation of these crops, rice can be made a part of the system with advantage. It does not follow, however, that cotton, cane, or corn will grow well where rice will thrive. On the contrary, the best rice lands are those which have an imperious substratum of clay, and, ordinarily, such lands are not very well adapted to sugar, corn, and cotton culture.

In selecting a site for a rice farm—we shall speak of lowland rice only for the present—rolling lands should be avoided, as it is impossible to flood such lands economically. The greatest expense in the cultivation of rice is the one connected with the construction of levees, and the amount of leveeing depends altogether upon the topography of the country. Perfectly level land presents ideal conditions for rice culture, because the "cuts" may be made as extensive as one may desire, the limit being the amount which can be planted in two or three days. A larger field would be impracticable, because the rice would not all germinate at the same time. The advantages of large cuts over small ones can not be exaggerated. Not only is the expense of leveeing very

much reduced, but the amount of unoccupied land is not so great, and there is not so much likelihood of the fields becoming infested with weeds, as these levees are veritable weed nurseries. Furthermore, if the nature of the soil permits, twine binders can be more profitably employed than in small cuts.

When the land slopes, on the other hand, the size of cuts depends altogether upon the grade. Rice will not thrive well in more than 8 or 10 inches of water, and if the land has a slope of, let us say, 3 inches to the acre it will be necessary to construct the levees every 2 acres, since 4 inches of water on the elevated end of the field will flood the rice to a depth of 10 inches at the lower end. Therefore the more the land slopes the nearer the levees have to be, and finally a limit is reached when gang plows and other implements can not be used, as every turn at the end of the cut represents a loss of time and money.

There are two other factors which should be considered in selecting a site for a rice farm, and these are irrigation and drainage. No one can undertake the cultivation of rice and afford to ignore them, and they are of such primary importance that they will be discussed under a separate heading.

PREPARATION OF THE SOIL.

The breaking of the land should begin as long before planting as possible; for, inasmuch as water remains on the soil during the whole period of growth of the rice crop, the micro-organisms which are responsible for nitrification whereby soluble nitrates are provided for the plant, remain dormant, if they be not totally destroyed, for lack of oxygen, and for this reason the land should be plowed as soon as possible after the first crop is gathered, in order to give the soil a thorough airing.

The breaking up of the soil can be effected with any ordinary steel plow, but where it is desired to grow rice on a large scale gang plows are more economical. There are different makes of these implements, but they are all constructed on the same principle and consist essentially of a broad plow or a number of smaller ones hung on a frame and wheels. With one of these and three or four mules a man can do five and six times the work in one day that he could do with an ordinary plow, and three gang plows are all that are needed to plow up a 500-acre farm.

The depth to which the soil should be plowed depends upon local conditions, and no general rule can be given that would be applicable to every case. For some soils plowing 5 or 6 inches deep gives the best results, whereas in other cases 3 or 4 inches are reported to give as satisfactory crops as deep plowing. In all old rice fields, however, the probabilities are that an artificial hardpan exists as a result of the shallow plowing which is practiced, and in such cases the land should be plowed deeply the first year, so as to permit of better under-drainage and in order that the roots of the plant may penetrate the soil more deeply in quest of food.

After the land is broken up it should be pulverized with a disk chopper and smoothing harrow to prevent the land from baking and to put it in such a condition that it will retain moisture. If the land is not too heavy, the disk chopper will not be necessary, any heavy harrow being sufficient.

PLANTING.

There are two ways in which rice may be planted. It may either be sown broadcast or it may be planted with a drill. Both methods are extensively used, but the best authorities advocate the use of the drill. Rice planted with the drill, it is claimed, will germinate more uniformly, and this is an important point in the cultivation of rice. Besides, when the land is grassy it is an easy matter to hoe and weed the rice if it has been drilled, whereas if it were sown broadcast the operations would be very much more difficult.

The seed may be sown to the depth of 2 inches in May and June and at the rate of 2 bushels to the acre. When the soil is very dry, a roller should be dragged over the field so as to compact the ground, thereby increasing the capillary power of the soil and thus causing moisture to rise from below. Should water be available, however, a better plan is to apply a sufficient quantity of it to saturate the soil and to pass a light harrow over the field as soon as it is sufficiently dry.

DRAINAGE.

Although rice is a water plant, good drainage is as essential in its cultivation as it is in that of any other crop. If the land will not admit of thorough drainage, it will be impossible to prepare the ground properly, and in consequence the

stand will be poor and the yield of the crop very much diminished. It is generally believed, too, that when rice approaches maturity the water should be withdrawn from the land, so as to permit of the formation of a good, heavy head. Rice can unquestionably ripen in water, but the character of the seed is very much affected for the worse thereby, and in milling such a crop it will not give as good an article of commerce as it would have given if the water had been withdrawn at the proper time.

It is in the harvesting of the crop, however, that drainage is most important. It matters not whether the rice is harvested with a reaper and binder or a sickle the field should be dry, so as to permit of the shocking of the rice in the field where it falls. So far as shocking rice in mud and water is concerned, that is absolutely out of the question, and to have to carry it to the levees, as is now done, is too slow and expensive a process.

IRRIGATION.

Of equal importance with drainage is the subject of irrigation. Unfortunately, the conditions are so favorable for the growth of rice during the rainy season that very little has been done to utilize the water supply by the large number of streams which traverse the country in every direction. Usually the rain water is sufficient to mature one crop, and the river water, which contains a large amount of silt and soluble plant food, has been permitted to flow uninterrupted to the sea.

The western farmer and the sugar planter of the Hawaiian Islands know what a difference irrigation makes in the yield of their crops, but such results are not as remarkable as those that are obtained in applying irrigation water to rice lands. In certain portions of Louisiana and Texas rice has been grown on some lands for a number of years, and they continue to yield nearly as much rice now as they did the first year they were cultivated, although the only fertilizer applied during the whole of this time has been irrigation water. Even here in the Philippines, where the yield of rice per acre is in the neighborhood of 600 pounds, lands have been made to produce 2,000 pounds with the help of irrigation.

We need not go far to find the reason for this. It is a well-recognized fact that no matter how rich in plant food a soil may be, the plant unaided can not assimilate any of it. By a wise provision of nature most of the plant food in the soil is stored in the form of insoluble compounds, and as such they can not be leached out by rain water. Before the rootlets of the plant can absorb this plant food it is necessary that it should be in soluble form, and this chemical operation is performed mostly by low forms of plant life, commonly known as bacteria. As was noted above, however, these special bacteria will thrive only in the presence of oxygen, and as rice lands are under water for a great part of the time the work of the bacteria is suspended, and consequently the supply of soluble food in the soil ceases to increase under these conditions, and unless the young plant is supplied with food from some other source it can not be expected to reach perfection.

Irrigation supplies this extraneous food, and although there may be but little fertilizers in the water, such an immense quantity of water is evaporated during the growth of the rice that a large amount of nitrogen, phosphoric acid, and potash are given up to the plant.

Another reason why irrigation should be employed in preference to rain water is because its temperature more nearly approaches that of the ground than does the temperature of rain water, and this is a point recognized to be of a good deal of importance.

Finally, by means of irrigation water two crops of rice could be grown on the same land in the course of a year and the yield of the land thereby doubled.

DITCHES AND LEVEES.

The most economical way of digging ditches and constructing levees is to make use of good, strong plows, scoops, and grading machines. With a plow, a scoop, and a pair of mules a man can do as much work in a day as he could do in two weeks with a spade. Where the operations are to be conducted on a large scale and the planter can afford to purchase a road machine, it would be

well for him to do so, as it is very useful in making the main channel or canal for conducting the water from the water supply to the field.

In building the levees around the different cuts the aim should be to make them broad and sloping rather than steep and narrow. The reason for this is that the former levees facilitate the use of agricultural implements.

A good plan is to plow a ridge 6 or 8 feet wide where the levee is to stand, and harrow down. As soon as it rains, plow up again, always throwing the dirt to the center, and continue this process until the bank has attained a sufficient height, usually 18 to 20 inches.

The question of utilizing the water supply, constructing reservoirs, dams, lifting water from rivers, etc., is too large a one for present discussion, and it will be made the subject of future bulletins.

TREATMENT OF THE CROP.

Should no irrigation water be available, as soon as the rice is 4 or 5 inches tall all the drains in the levees are to be closed so as to retain the rain water, and if the season is favorable sufficient water will be caught to keep the grass smothered and to mature the rice. In no case should the water completely cover the rice.

Where irrigation is practiced, enough water to saturate the soil may be applied when the rice is 2 or 3 inches tall, provided it stands in need of it. This will give the crop an early start, and this is important, for in the struggle for existence with the grass rapid growth in the rice is all important.

In the course of three or four weeks the rice will be 7 or 8 inches tall, and water may be turned on to the depth of 4 inches. As the rice grows, more water should be added until it stands about 8 inches deep.

When possible it is well to keep the water in circulation, as it prevents the growth of certain grasses which thrive in stagnant water. This can be done by permitting a certain amount of water to escape at the lower end of the field and supplying a corresponding amount at the upper end.

Ordinarily no further attention is necessary until the crop is ready to be harvested, but should weeds spring up among the rice plants they will have to be pulled, and occasionally the rice becomes so grassy that all growth ceases and the plant assumes a yellow color. In such a case there are only two remedies—either more water must be admitted so as to completely submerge the grass, or, if the rice is too small to permit of such a treatment, the water must be completely withdrawn and the field mowed down. The rice, by virtue of the rapidity with which it grows, when mown down will soon outstrip the grass, and by flooding at the proper time the crop can be saved.

There should very seldom be an occasion for such heroic treatment, however, on a plantation which has sufficient irrigation water, because, with a proper system of control, the grass can nearly always be completely covered with water and thus smothered out.

Within ten or twelve days before the grain is ripe the water should be completely drained off. The time to draw off the water can be easily ascertained by noticing the color and position of the heads and the consistence of the grain. As the rice begins to ripen the heads assume a drooping position and they take on a pale straw color. As above noted, the grain, too, is a good guide, for on breaking it it will be found to be of the consistency of dough.

HARVESTING.

The harvesting of the rice crop is an operation which can be performed either with the sickle, the cradle, or the reaper and binder. Whenever it is possible to use a reaper and binder one of the greatest expenses in rice growing is reduced to a minimum. With the use of this machine and 6 mules a man can reap from 8 to 12 acres a day. Unfortunately, it is not every field which can be reaped with a twine binder, and its use on any given tract of land is determined by three conditions: First, the land must be susceptible of thorough drainage; next, an impervious substratum of clay must underlay the land; and finally, the harvesting season must be moderately dry. Without these three conditions the twine binder is impracticable. The machine is a heavy one, and unless the ground is dry it will sink so deeply as to be very heavy to pull. In addition to

this the drive wheel becomes so clogged with mud and bits of straw that it slides along the ground instead of turning, and, in consequence, the knives are stopped.

Whether the physical condition of the soil will permit of the general introduction of this valuable machine in the rice fields of the Philippines is an unsettled question. The bureau has a reaper and binder among its collection of agricultural machinery, and a thorough test of its efficiency will be made as soon as practicable.

Where it is not possible to make use of the twine binder, sickles and cradles are employed, the rice being cut with about 2 feet of straw and tied in bundles about 6 inches in diameter. Some 25 or 30 of these bundles are shocked together and a few bundles placed on top of the shocks to protect the grain from too much sun and from the depredations of birds.

THRESHING.

The machines employed in threshing rice are practically the same as those used in the wheat fields of the western United States. Their capacities range from 40,000 to 90,000 pounds of paddy per day, and it can readily be seen that a small farmer does not stand in need of a thresher for his exclusive use. Not only this, but in the United States the cost of a threshing machine, including engine, is \$1,200 gold, and it is only persons of some means, even in America, who can purchase them.

In order to overcome this difficulty it is customary for some person to buy a machine and charge the farmers so much per sack for threshing their rice. The threshers are portable and are hauled from place to place by the traction engines, which furnish the power for operating the threshers. In case a farmer has only 50 or 100 sacks, however, he has to haul the rice in the straw to the machine, because it is not profitable to move the thresher unless it can do a day's work in one place.

Rice threshing is a very profitable business in the United States. As much as \$75 net per day is earned by some threshers, and although the rice industry may not have recovered sufficiently from the recent troubles to warrant their introduction in the provinces just now, we can see no reason why threshers situated at central points should not prove profitable in the near future.

FERTILIZERS.

In determining the kind of fertilizers and the quantity which should be applied to a soil in order to grow any given crop, one of the most essential things to know is the composition of the plant, for by knowing this we get a good idea of the fertilizing materials which the crop extracts from the soil, and thus we are able to supply this drain judiciously.

The average analysis of the rice plant shows that every 100 pounds of the grain contains 1.19 pounds of nitrogen, 0.321 pound of phosphoric acid, and 0.16 pound of potash; and 100 pounds of the straw contains 0.756 pound of nitrogen, 0.26 pound of phosphoric acid, and 0.42 pound of potash. Therefore an acre of land which produces 2,000 pounds of paddy and 4,000 pounds of straw will lose a total of—

	Nitro- gen.	Phos- phoric acid.	Potash.
2,000 pounds paddy.....	23.80	6.42	3.20
4,000 pounds straw.....	30.24	10.40	16.80
Total.....	54.04	16.82	20.00

With these figures we should be able to form a fair estimate of the amount of fertilizer to apply to rice land. But from this a deduction in the amount of nitrogen to be applied may be made for the nitrogen which is brought to the soil in rain water, and where irrigation is practiced a deduction may be made not only in the amount of nitrogen, but also in the phosphoric acid and potash. What this amount is it will be impossible to say until chemical analyses are

made of the waters of the principal rivers and streams of these islands, and it is to be hoped that data in reference to this matter will be available in the near future.

Just in what form to apply fertilizers to rice lands is another question to be considered. Rice is so peculiar in its habits of growth that the matter of fertilizing it is very much more complicated than is the case of ordinary crops. As was noted above, nitrification is an impossibility in a field of growing rice which is under water, consequently the application of any but soluble fertilizers will give no immediate results, and such soluble fertilizers as sodium nitrate and water-soluble phosphates are so high priced that it is questionable whether they will ever be extensively used. The only practical scheme that can be suggested just now is that the land be fertilized and fallowed or that a system of rotation such as is practiced in Java be introduced. By rotating the crop with corn, leguminous plants, cane, and cotton, not only is it possible to fertilize the land and increase the subsequent yield, but noxious weeds can be either totally destroyed or at least greatly decimated.

VARIETIES.

The number of distinct varieties of rice is variously estimated at from 1,400 to 3,000. Whether there are even so many as 1,400 or whether the same variety bears different names in different localities is not known. It is very well recognized, nevertheless, that varieties play an important part in the color, shape, size, taste, yield, and maturity of the grain, and too much care and judgment can not be exercised in selecting seed. Many of the good effects of efficient cultivation will be lost if an inferior variety of seed is planted, and there are certain varieties of rice which are so poorly adapted to the milling process that great financial losses are incurred in cultivating them.

In certain parts of the United States where Honduras rice was formerly exclusively grown this loss was so great that seed rice was imported from Japan with the view of obviating this defect in the Honduras, and the Japanese rice gave such satisfactory results, not only in the greater resisting power which it possessed in withstanding the breakage of the mills, but also in the yield per acre, that larger quantities were imported the following year, and now the Japanese rice is cultivated very extensively.

Some of this Japan rice has lately been imported by the insular bureau of agriculture and is now being distributed to the farmers of the islands.

UPLAND OR MOUNTAIN RICE.

This rice, as its name implies, is cultivated where the land is too rolling to practice flooding. Large amounts of it are raised in these islands, and in certain districts where the valleys are narrow and level lands are scarce mountain rice constitutes the principal article of food of the natives.

In regard to its cultivation, very little need be said more than has already been stated in regard to lowland rice. The cultivation and harvesting of the crop are practically the same as for flooded rice, excepting that no provision need be made for leveling. The only difference between the cultivation of the upland and the lowland rice lies in the fact that the former has to be frequently hoed and weeded, because there is not water on the land to smother the grass.

CONCLUSION.

In conclusion we wish to reiterate that there is no reason why scientific methods of culture and modern agricultural implements should not make the Philippines one of the leading rice countries of the world. It was not many years ago when the rice industry in Louisiana was on the same footing with the rice industry of the Orient and yet such a revolution has been effected in the cultivation of rice in that State within the last fifteen years as has not been accomplished in Chinese rice culture in six thousand years.

APPENDIX.

IMPLEMENTS AND DRAFT ANIMALS REQUIRED TO CULTIVATE A 500-ACRE FARM.

For the information of those readers of this bulletin who may be interested in the matter, the following statement relative to the number of draft animals and kind of machinery required to cultivate a 500-acre rice farm, together with the cost thereof in United States currency, is appended:

	Number.	Cost.
Mules.....	20	\$3,000
12-inch gang plows.....	3	135
Disk harrows.....	3	60
Smoothing harrows.....	3	45
Twine binders for harvesting.....	3	450
Thresher and traction engine.....	1	1,250
Total.....		4,940

The thresher can be made to thresh the rice of 1,000 or 1,500 acres, so that if anyone should wish to cultivate that amount of land it would only be necessary to purchase 40 or 60 mules and the proper multiple of machinery stated for a 500-acre farm, exclusive of thresher.

The gross receipts for the crop of a 500-acre farm will vary in the United States from \$15,000 to \$20,000 gold, according to the amount of red rice found in the paddy.

[From Report of the Philippine Commission, 1905, vol. 3, p. 121.]

Rice imported into the Philippine Islands during the fiscal year 1905, by ports.

Port.	Pounds.	Value.	Duty.
Manila.....	344,027,583	\$4,504,494	\$797,446
Cebu.....	143,885,971	1,947,709	335,505
Iloilo.....	66,062,797	863,252	153,880
Jolo.....	4,946,334	77,172	13,614
Zamboanga.....	4,170,239	59,786	10,460
Bongao.....	139,590	2,908	406
Balabac.....	72,362	1,367	235
Total.....	568,285,346	7,456,738	1,311,496

[From Report of the Philippine Commission, 1904, vol. 2, p. 495.]

TRANSPLANTING RICE.

The natives universally start their rice in seed beds in June and July; they prepare their land as fast as they can by plowing and harrowing in mud until the middle of October, and as fast as they get a piece clean, set the young rice about 9 by 9 inches. This plan is well-nigh universal in oriental countries. The reason for this plan, no doubt, grew out of the fact that, by setting rice 6 weeks old and 10 inches high in freshly cleaned land, it more easily keeps the mastery over the noxious grasses and weeds. Then, with rice of such height, irrigation water can be put on the land much earlier and deeper, and thus keep the weeds and grass down. With the slow and faulty way of preparing the land, practiced in the islands, it is quite likely that rice seeded in the American way at the beginning of the wet season would make but little crop.

We have fully tried the native's plan of setting rice, having put in several hundred acres in this way. We find that \$1 gold will take up the plants and transplant an acre. We also have several hundred acres seeded in the American way, which are in every way promising. The transplanting enables us to lengthen the planting season by six weeks.

The rice farm has about 25 horses and mules for doing its work, besides some breeding mares and ponies. It is found that horses and mules can stand work here fully as well as in the Southern States of America. With us, four mules and one native teamster break 4 acres of land a day. With the native farmer one man and two carabaos break 1 acre in five days. The reason for having two carabaos is that a carabao must spend half the time wallowing in mud and water, and, hence, two must be had so as to change every hour or two. The native plow is a small affair, cutting about 4½ inches.

So the native's weak point and great waste of time is not in the transplanting of rice—there are women and children enough to plant the whole islands—but it is in the ridiculously slow method of preparing the land.

With some Chinese oxen with which we have been experimenting, four oxen and a native plowman have been able to plow 2½ acres a day. These oxen can work ten hours a day without suffering from heat. We have tried them in the mud, and they appear to do as well as carabaos. These cattle can do so much more work than carabaos that with them there will be less necessity for plowing in mud, as so much more of the work can be done before the land gets muddy. The oxen seem to resist disease much better than carabaos and get their living from grazing almost as well.

[From Report of the Philippine Commission 1906, vol. 2, p. 46.]

MURCIA RICE FARM.

The rice farm at Murcia, Tarlac, having served its purpose in an experimental way and not being suited to the raising of rice on a commercially profitable scale on account of the barrenness of the soil and the rolling nature of the land, has been discontinued, but not before results of great importance to the rice growers between Manila and Dagupan were obtained. The advantages incident to steam threshing were first demonstrated at this place, and as a result a considerable number of steam threshing outfits have been purchased and are now in operation.

The wisdom of the Filipino in sowing his rice in seed beds, and transplanting it after it has attained a considerable size, has been conclusively demonstrated. His land is poorly prepared, and if his rice is scattered broadcast over it the young seedlings are promptly killed by coarse grasses and weeds, whereas the larger plants at the time of transplanting have a sufficient start over the weeds, so that they are able to hold their own. The trouble with this method, however, lies in the amount of labor necessary to plant a comparatively small area. It was found that by sowing rice in drills 15 to 20 inches apart, so as to facilitate weeding, crops could be obtained which were nearly as heavy as those secured by transplanting. If the rice is drilled in, large areas obviously can be planted during the comparatively short season.

It has been found that crops planted in May or June ripen no sooner than those planted in August or September, but that the early plantings give a vastly better yield than do the later ones. It now seems probable that, with artificial irrigation, seed might be put out at least a month earlier than is the general practice at present, without maturing a crop before the close of the rainy season.

There is little doubt that the Philippine rice fields would yield 25 per cent more than they do at present were they kept clear of grass and weeds during the growing season, and circular letters have been sent to the governors of all important rice-growing provinces calling attention to the necessity of convincing the farmers that they should weed their rice. A number of governors have displayed a keen interest in this matter and have not only issued proper instructions to municipal officials, but have themselves gone to inspect the rice fields and urged the people to keep them clean.

It is hoped that a sufficient number of planters will interest themselves in this matter to at least give numerous practical demonstrations of the importance of weeding, so that next year there may be noticeable improvement in the care given the fields, with a corresponding increase in the crop.

The importations of rice during the year just ended were far less than for any previous year since American occupation. Scanty rainfall has seriously imperiled this year's crop in many of the provinces, but if rain comes before irreparable damage has been done it is believed that its crop will be nearly sufficient to meet the needs of the islands.

Full details as to the experimental plantings of rice which have been made and the results in each case will be found in the accompanying report of the director of agriculture.

The best yield was obtained on land which had been fertilized with 600 pounds of tobacco waste to the acre, from the Manila factories, and was at the rate of 2,900 pounds of unhulled rice to the acre. This experiment showed that a large amount of valuable fertilizer is going to waste at the Manila tobacco factories.

As a result of the practical demonstrations at Murcia, a considerable number of steam-plowing outfits have been purchased and put into operation. The results obtained seem to have been uniformly satisfactory. The cost of plowing land by steam has varied from ₱2 to ₱6 per acre, the difference depending chiefly upon the ease or difficulty with which fuel and water were secured.

The great weight of steam-plowing outfits is the chief obstacle to their introduction. Two machines for use in eastern Negros lay in Manila many months before they could be shipped, and the landing of heavy machinery at ports where there are no piers and no large lighters is necessarily a matter of great difficulty.

In its efforts to secure a lighter plowing outfit, the bureau of agriculture has experimented with a kerosene-explosion engine weighing only 2,800 pounds. This engine develops plenty of power, but thus far has proved unreliable in its action. The agents maintain that the difficulty is due to defects in the sparking device and can readily be remedied. Should this engine prove successful it would fill a great need, as its lower cost would put it within the reach of many persons who could not afford to purchase a large steam-plowing outfit, and its small weight would facilitate its passage over bad roads and weak bridges.

PHILIPPINE IMPORTS OF RICE—FROM OFFICIAL RECORDS, BUREAU OF INSULAR AFFAIRS.

Calendar year.	China.		British East Indies.		French East Indies.		Siam.		Other countries.		Total.
	Pounds.		Pounds.		Pounds.		Pounds.		Pounds.		
1885	38,574	81,238	52,730,117	9709,781	9457,070	771,430	59,094	82,578	98,544,686	81,248,097	
1886	8,192,054	31,164	1,415,180	50,183,080	584,130	4,866,714	918,174	12,133	189,324,854	2,043,616	
1887	479,478	5,455	1,004,678	65,734,064	702,580	35,760	3,652,568	64,819	176,841,485	1,613,682	
1888	33,983,900	690,916	2,083,180	111,014,693	1,080,562	7,440,252	99,107	3,652,970	181,759,319	1,904,085	
1889	45,778,092	1,790,190	147,423	130,661,968	1,878,238	2,981,001	40,940	823,465	385,310,067	3,865,530	
Average, annual	16,968,620	489,798	56,556,296	696,250	76,695,181	8,669,639	49,445	2,347,446	25,381	155,862,172	2,191,463
1890	20,118,924	268,963	147,429	130,083,686	1,145,608	912,255	10,284	166,894,138	1,572,279		
1891	28,085,354	292,999	76,066	141,965,592	1,490,421	4,856,280	44,078	189,241,855	1,693,604		
1892	25,277,960	198,355	11,719,876	101,137,698	786,622	113,189	8,779	138,248,598	1,073,898		
1893	15,074,391	104,798	29,847	70,896,088	426,824	135,618	874	90,339,709	623,331		
1894	13,818,543	80,551	9,165,192	51,864	74,739,485	434,664	1,186,692	6,800	96,921,912	568,579	
Average, annual	20,475,068	186,731	9,804,534	79,255	101,618,484	853,896	1,441,184	12,588	133,339,235	1,138,395	
1900	201,121,848	2,478,890	8,292,064	132,181	44,070,884	741,498	31,811	66,134,825	980,676	321,514,118	4,965,092
1901	107,987,106	1,448,231	52,685,988	702,980	178,767,827	2,283,704	40,594	1,209,483	19,494,444	376,211,389	6,708,644
1902	177,000,981	2,439,011	17,541,887	250,082	412,984,601	5,672,027	438,850	6,307,393	86,928	699,683,177	9,794,893
1903	101,884,851	1,683,848	90,940,942	1,547,634	474,068,080	8,112,068	59,231,754	11,907,897	199,742	787,083,174	12,458,381
1904			66,510,582	874,406	499,039,371	6,371,981	29,582,406	468,306	8,759	685,880,567	7,710,768
Average, annual	117,616,957	1,905,996	47,194,292	701,450	318,798,153	4,684,256	51,468,988	17,011,474	239,110	582,093,864	7,704,184
10 months ending October, 1905.	1,222	32	38,063,154	467,610	341,012,538	4,710,851	62,421,678	2,716,066	40,690	439,204,648	6,111,642

NOTE.—Hongkong included under British East Indies from 1885 to 1887; from 1888 to 1894 under China, and from 1900 to 1904 under other countries.

DUTY ON RICE.

March 3, 1906.		March 3, 1906.		In terms of 100 kilos.
PHILIPPINE TARIFF.		UNITED STATES TARIFF.		
Rice—Until May 1, 1906:		Rice cleaned.....per pound..	\$0.02	\$4.40
(a) Unhusked, G. W., 100 kilos.....	\$0.40	Uncleaned rice, or rice free of the outer hull and still having the inner cuticle on.....per pound.	.0125	2.75
(b) Husked, G. W., 100 kilos.....	.50	Rice flour and rice meal, and rice broken which will pass through a sieve known com- mercially as No. 12 wire sieve, per pound..	.0025	.55
(c) Flour, G. W., 100 kilos.....	1.50	Paddy, or rice having the outer hull on.....per pound..	.0075	.65
On May 1, 1906, and until Jan. 1, 1907:				
(a) Unhusked, G. W., 100 kilos.....	.60			
(b) Husked, G. W., 100 kilos.....	.75			
(c) Flour, G. W., 100 kilos.....	1.75			
On and after Jan. 1, 1907:				
(a) Unhusked, G. W., 100 kilos.....	.80			
(b) Husked, G. W., 100 kilos.....	1.00			
(c) Flour, G. W., 100 kilos.....	2.00			
<i>Provided, however, That the Philippine Com- mission may, in its discretion, continue in force the rate of duty first above stated until, in its opinion, the conditions in the Philippine Is- lands may warrant the higher rates therein provided.</i>				

NOTE.—Philippine rice production in census year (1902) is stated at Volume IV, page 328, to have been 8,599,233 hectoliters of paddy, or unhulled rice (2.8375 bushels to the hectoliter), or 2,440,032 bushels (bulk measure). On page 91, ratio of unhulled to hulled is 2 to 1, and reduced in weight on basis of 60 pounds to the bushel, gives production in round numbers of 732,000,000 pounds.

KAPOK (Tree Cotton).

[From Report of the Philippine Commission, 1904, vol. 2, p. 536.]

The cotton tree is found in nearly every province of the Philippine Islands. Its fiber is used locally for stuffing pillows and mattresses and is shipped in small quantities to Manila, principally from Oriental Negros. The good qualities of kapok are such, it being one of the most valuable of the so-called "stuffing and filling" fibers, as to warrant its more general cultivation. The tree is easily grown and the yield of fiber is large.

In January of the present year a press bulletin on this subject was issued entitled "The White Cotton Tree." In this bulletin attention was invited to the importance of the kapok industry in the island of Java and the desirability of its further development in the Philippines. The production of kapok in Java has increased from 300,000 kilos (700,000 pounds) in 1882 to over 4,000,000 kilos (9,000,000 pounds) in 1901. During the first six months of 1902, which was a period of industrial depression in Java, 20,398 bales of kapok were exported, of which the United States received about \$50,000 worth.

During the month of January an order was placed by the bureau for an improved kapok-cleaning machine. A superior variety of the cotton tree having been reported from Colombia, South America, the United States consul at Quibdo has been requested to furnish this bureau with seed of this variety. With favorable soil and climatic conditions, and with the present distribution of the cotton tree, it is believed that, by the introduction of fiber-cleaning machines and with the further distribution of seed, this fiber may be produced in sufficient quantities for export.

[From Report of the Philippine Commission, 1905, vol. 2, p. 42.]

The chief of the bureau, knowing that kapok, or tree cotton, was produced in considerable quantity in the islands, has investigated its use and its price in the United States market. He finds that a pound of kapok makes as large and as good a pillow as do 2 pounds of feathers, and even at American prices costs but one-eighth as much. Also that kapok will buoy up thirty-five times its own weight in water and does not become wetted after long submersion. A French society, in making experiments with it as life-saving material, proved that after soaking eighteen hours a small mattress would still support several men. The fiber is extraordinarily elastic and seems to retain its elasticity indefinitely. It is very valuable for use in fine upholstering, and should be one of the best of substances for preparing comforts for covering in cold climates. Probably 1,000,000 pounds of it go to waste annually in the Philippine Islands. It may be had here in abundance at about 5 centavos per pound in the seed, the seed making up about 63 per cent of the total weight. A McCarthy cotton gin readily cleans it from the seed. The New York price is 12 to 13 cents gold.

The seed has been analyzed at the bureau of government laboratories, and was found to be 38 per cent richer in oil than is ordinary cotton seed. It has a fertilizing value of about \$17 gold per ton, and has been fed with advantage to different kinds of stock by the bureau of agriculture.

The kapok tree is possessed of extraordinary vitality. The trunk, if cut down during the rainy season, trimmed of all branches, and set in the ground, will send out roots and grow, while single branches stuck into the ground at this season promptly take root and soon grow into trees. The trees require absolutely no care, and the pods containing the cotton fall to the ground when ripe.

There are vast areas in these islands perfectly suited to the growth of this valuable fiber-producing tree, and an important kapok industry should be developed in the near future.

[From Report of the Philippine Commission, 1905, vol. 2, p. 431.]

This product has received much attention. It is no doubt the world's finest stuffing material, and a recent cablegram quotes its price in New York at 12½ cents gold per pound. It has been determined that large quantities can be had in the islands at about 5 cents Philippine currency in the seed, the seed making up about 63 per cent of the weight. We found that a McCarthy gin for ordinary cotton cleans it perfectly of the seed. The price in New York should enable those buying, cleaning, and shipping it to make a good profit. We submitted the seeds to the bureau of government laboratories for analysis, and they were found to be 38 per cent richer in oil than the ordinary cotton seed. They should have a fertilizing value of about \$17 gold per ton. We have been feeding them to advantage to different kinds of stock.

Wishing to learn still further about this fiber, we have made tests that prove that one pound of the cleaned kapok makes as large and as good a pillow as two pounds of feathers. Counting kapok at 12½ cents a pound and feathers at 50 cents a pound, the former is eight times as cheap a stuffing material as the latter. It seems never to lose its elasticity and never packs or mats as real cotton does. It does not become wet if immersed in water ever so long. It is claimed to be the best material for life preservers known, being much superior to cork.

It will buoy up and keep above water 35 times its own weight, and 10½ ounces of the material have been found to support a man weighing 145 pounds in the water. A French society in making some experiments with it as life-saving material is said to have found that after soaking for 18 hours a small mattress made thereof supported several men.

According to our experiments it seems that a kapok pillow equal to a 2-pound feather pillow can be made complete for less than 25 cents gold. A feather pillow will probably not sell in competition with pillows made of kapok after the latter's merits shall have become well known. The slow changes taking place in the animal matter of feather create disagreeable odors. On account of cheaper covering material the kapok can be shipped to the United States and there a pillow could be turned out for about 25 cents that would be superior to a feather pillow which would cost not less than \$1.25. It would seem also that thick comforts for covering in cold climates could be made to great advantage out of this material, inasmuch as a comfort, say, 3 inches thick and making practically a dead air space of this thickness, would not weigh as much as a double blanket. As a mattress material 10 pounds would equal 20 pounds of feathers, and, I believe, 40 pounds of felt. It would therefore seem that there is a remarkable opportunity in the United States for pushing this Philippine product, and as a result of our investigations a large amount of kapok is in preparation to be sent there for sale, the markets having been tested by cable. It is almost certain that a reliable supply and a reasonable amount of advertising would create a demand for more than the whole world now uses. In this connection a letter was sent to a dozen or more upholstery firms in the United States, as follows:

"BUREAU OF AGRICULTURE,

"Manila, P. I., July 10, 1905.

"GENTLEMEN: Are you acquainted with the kapok, or tree cotton, for pillows, cushions, mattresses, etc., and, if so, do you use it? I believe that a pound of cleaned kapok will make as good a pillow as two pounds of the best feathers, and would always be free from the decomposition and the more or less unhealthful odors that must arise from feathers, hair, wool, etc.

"Seeing the excellent qualities of this material for various purposes of the kind mentioned, I have been surprised that firms such as yours have not made up this material and advertised it extensively on its merits. There must be one or more million pounds of cleaned cotton going to waste in these islands each year. This bureau is now making an effort to put it in touch with the people who buy it, or should buy it. We have at the present time some 60,000 pounds of it collected. We are sending you a small sample, and would like to hear from you as to its market value, its qualities, etc.

"Very respectfully,

"W. C. WELBORN, *Chief of Bureau.*"

[From Report of the Philippine Commission, 1906, vol. 2, p. 172.]

Some commercial shipments of kapok, or stuffing cotton, have gone to the United States since we discussed its value last year. A machine was received from England for cleaning it of seed, but the machine was a failure. A slow-working English cotton gin does work it, but not rapidly enough to meet the conditions of large development. The American saw gin failed to work it. Lately a commercial firm has received an American machine designed and built especially to clean it, but this machine has not yet been set up. To clean this material would seem to present no great difficulties, and a machine would not need to be very strong, heavy, or expensive.

The kapok, from numerous inquiries I made in the United States, appears to have a steady value of 9 to 13 cents United States currency a pound. It sells in some of the provinces as low as ₱3 a picul (137½ pounds) in the seed. It turns out about 35 per cent lint and 65 per cent seed. The seed have an oil content and the cake a fertilizing and feeding value that ought to give the seed a value of ₱50 to ₱60 a ton. Even at a higher purchase price for the raw cotton, fine profits should be made by buying and cleaning this material with suitable machines.

The real cotton has generally not been successful with us. A species of boll weevil generally prevents any yield of account. There may be localities where this insect is not found, but at present we do not feel like encouraging cotton growing in more than an experimental way.

A new and unidentified species of agave, said to be quite superior to Yucatan sisal, has been introduced from Tuxpan, Mexico.

INDIGO AND OTHER DYE PLANTS.

[From Report of the Schurman Philippine Commission, 1900, vol. 4, p. 52.]

INDIGO INDUSTRY.

The production of indigo was formerly of much more importance than now. The method of making it in this archipelago will now be spoken of. This includes several operations, maceration in water, the addition of lime, shaking or stirring and decantation of the water, formation of the indigo into masses, and wrapping. After the plant is cut and made up into bundles it is taken to the factory. This is composed of various parts. In the first there are two or more cylindrical or conical receptacles made of masonry or wood, each being 2½ meters in height and 2 in diameter. These are called machos. In the second, called hembra, there is a receptacle double the capacity of those already mentioned which is cylindrical in shape, wider than it is high, the sides somewhat inclined, and having two faucets at different heights on the side, through which the impregnated liquor can flow; in the third a receptacle, made of masonry, which is in circular form, a meter and a half high and a meter in diameter, into which the indigo paste coming from the hembra is placed, in order to separate the water from it, and lastly the secadero, where the indigo is exposed to the air and afterwards dried.

Maceration is the first process. The receptacles called machos are filled four-fifths full of water and the bundles of indigo immediately thrown in them. A grating of bamboo having weights attached is now lowered 4 or 5 inches below the surface of the water, the plant being allowed to macerate for twenty-two hours, during which time the leaves undergo a sort of fermentation, liberating the indigo which is held in solution in the water. During this operation the water first becomes yellowish in color, then yellowish-green, and finally green with a yellowish tinge. The maceration being complete, lime is added. In this operation the grating is first removed and the plants taken out after being allowed to drain on the sides of the receptacle. Baskets of quicklime are then lowered into the water, when the liquid immediately changes from green to greenish-blue. It is then drawn off immediately by means of the faucets, beginning with the upper one, and passed on to the hembra or second receptacle by means of little troughs. In the hembra the liquid is stirred with sticks, thus exposing it to the air so that the indigo becomes insoluble. This operation lasts from half an hour to an hour. At the end of the operation the water is bluish-brown in color. It is allowed to remain until more water is added from the first receptacle, when the same operation is repeated. The indigo deposited is now allowed to remain fifteen or twenty days, when it is transferred to the third receptacle. Here it remains for two or three days, becoming separated from the greater part of the water which it contains, this being drawn off by the faucets.

In this place the various grades of indigo become distinguishable, the upper layers containing the superior grade, the central layers the medium grade, and the lower layers the inferior grade. The indigo is now placed in bamboo boxes, having a layer of cotton in the bottom so that the water may drain through. At the end of two days the mass is kneaded by hand into cakes or balls, which are placed on mats arranged on benches in the drying room. Here the drying process continues for five or six days, the indigo being placed in the sun as often as possible, so as to advance the process more rapidly. The mass is now cut with bamboo knives into the proper size, which is usually about 6 inches in length by half as much in depth and height, the corners of the cake being rounded off with the hand. After the cakes are dried they are placed in wooden boxes, where they are kept ready for the market.

[From Census of Philippine Islands, 1903, vol. 4, p. 97.]

INDIGO.

The production of indigo and *tintarron* (liquid indigo), though of minor importance as compared with other products of which mention has been made, has been a source of considerable income and has contributed appreciable amounts to the sum total of insular exports, as indicated by the following table, which shows the quantities and values of the two products for each calendar year since 1854 for which statistics are available, with the percentage that such values were of the total value of exports annually.

Quantities and values of indigo and tintarron (liquid indigo) exported from the Philippine Islands during each calendar year specified: 1854 to 1902.

Year.	Indigo.			Tintarron.			Total value (dollars).	Per cent of total value of exports.
	Quantity (kilos.).	Value.		Quantity (kilos.).	Value.			
		Pesos.	Dollars.		Pesos.	Dollars.		
1854.....	194,727	82,349	87,224	* 8,471	25,818	27,346	114,570	1.70
1855.....	321,814	199,434	209,566	* 2,027	5,001	5,255	214,820	3.34
1856.....	299,083	134,744	141,589	* 10,610	31,890	33,447	175,086	1.82
1857.....	302,908	241,540	256,781	* 2,180	7,070	7,516	264,297	2.09
1858.....	17,853	12,338	12,965	* 6,945	25,008	26,278	39,248	.40
1860.....	121,842	82,417	87,576	* 8,707	32,575	34,614	122,190	1.21
1861.....	184,834	110,545	116,017	* 10,556	36,946	38,775	154,792	1.33
1862.....	134,864	88,036	93,107	(b)	62,287	65,875	158,982	1.06
1863.....	72,608	49,502	52,314	847,097	89,253	94,323	146,637	1.38
1864.....	114,848	117,074	123,724	157,686	14,810	15,651	139,375	1.24
1865.....	163,384	154,587	162,538	557,726	112,436	118,214	280,747	1.28
1866.....	251,574	460,760	484,766	659,206	138,922	140,899	625,665	2.68
1867.....	24,677	47,458	49,522	513,511	91,982	95,963	145,505	.63
1873.....	12,967	7,792	7,946	629,485	125,897	128,377	186,323	.67
1874.....	64,965	44,708	44,923	201,471	26,439	26,566	71,499	.41
1875.....	117,098	85,294	83,264	528,058	24,550	23,996	107,290	.68
1876.....	139,579	107,112	97,975	572,946	25,285	23,128	121,108	.89
1877.....	198,552	148,520	140,262	56,814	3,466	3,273	143,685	.93
1878.....	70,764	37,685	34,112	213,300	16,758	15,189	49,801	.31
1879.....	192,121	192,192	169,725	221,611	15,516	13,702	183,427	1.10
1880.....	139,151	137,147	123,405	429,553	41,919	37,719	161,124	.76
1881.....	159,631	138,958	123,631	83,226	8,256	7,345	180,976	.90
1882.....	83,485	62,674	55,924	521,136	51,696	46,123	102,052	.65
1883.....	33,067	23,322	20,341	378,870	25,042	21,842	43,188	.18
1884.....	51,100	34,287	29,964	395,306	25,416	22,226	52,210	.26
1885.....	67,338	42,129	35,169	332,231	24,540	20,496	55,655	.27
1886.....	50,044	35,425	27,668	327,467	19,890	15,546	43,284	.22
1887.....	106,757	68,879	53,009	668,964	43,836	38,351	86,360	.44
1888.....	183,487	128,469	94,862	419,738	22,820	16,850	111,712	.57
1889.....	121,516	108,374	79,633	363,575	15,321	11,258	90,891	.35
1890.....	66,653	16,416	13,497	507,276	17,280	14,206	27,705	.13
1891.....	95,561	59,184	45,945	391,358	21,430	16,696	62,561	.30
1892.....	317,015	204,975	140,367	408,836	19,192	13,143	153,510	.80
1893.....	107,133	85,072	62,158	276,424	13,575	8,323	60,481	.27
1894.....	25,072	33,976	16,947	191,794	17,000	8,480	25,427	.15
1896.....	(c)			(c)				
1899.....	116,370		32,604	(c)			* 32,604	.22
1900.....	5,545		1,325	(c)			* 1,325	.01
1901.....	7,894		3,178	(c)			* 3,178	.01
1902.....	251,025		16,573	(c)			* 16,573	.06

* Tinajas.

b Quantity not specified.

c Not separately reported.

d Not including tintarron.

The provinces of Ilocos Norte and Ilocos Sur produce more indigo than all other provinces combined. The dye is produced, however, to some extent in the provinces of Bataan, Batangas, Bulacan, La Laguna, Pampanga, Pangasinan, and Zambales. It will be observed that in the years 1900, 1901, and 1902 the values of annual shipments fell considerably below those of the preceding years, for which figures are presented in the above table. This falling off is said to be due largely to the use of aniline dyes and to adulterations made by Chinese speculators in the dye, which has discredited the Philippine product and caused a depreciation in its price.

CULTIVATION OF THE INDIGO PLANT.

[By Amelio A. y Lallave, Ilocos Sur.]

The indigo plant had its origin in India, and is to be found in nearly all the provinces of the Philippine Islands, especially in Ilocos Sur, and though still cultivated in the islands it is only upon a very reduced scale.

This plant requires fertile soil; if virgin, so much the better. At the close of the rainy season—that is, in October—preparation of the ground should be begun. Deep tillage should be given it with the plow, and the operation repeated at the end of the month. At the beginning of November a third plowing is effected and the ground harrowed, so as to leave the soil well crumbled. Sowing is then proceeded with. Furrows are made, as nearly straight as possible, and about a foot apart. The planter carries the seeds in a small sack under his left arm, and with his right hand scatters them copiously into the furrows, which he then covers with earth, using both feet. This operation is easily performed by our planters.

A few days after planting the seeds begin to germinate, and when the plants have attained a height of one palm or less the ground is once more plowed between the furrows, if soil conditions require it, for the purpose of cleaning it of all weeds and at the same time heaping the earth about the plants. Thenceforward the plants develop rapidly, and in two and a half months are usually in condition for cutting, which is done when they are about to bloom. Harvesting is then effected.

When the plants are cut they should be immediately conveyed to the place where the operation of extracting the dyestuff is to be performed. Haste is recommended, because the least delay may cause fermentation in the leaves, thus causing injury to the product. The extraction of the coloring matter is effected in the following manner:

The necessary apparatus for this manufacture should be placed near the plants and where water can be had. If this be not possible, a well should be dug, so as to supply the necessary water, the amount required depending upon the quantity of leaves to be treated.

The receptacles in which the leaves are to be deposited are called machos and are made of masonry. There may be one, two, or more of them, according to the number of leaves to be treated daily. They should be cylindrical and provided with three or four spigots, which are usually made of cane, through which the liquid is drawn off. Underneath and at right angles to the spigots is constructed a small leakage tank, which catches the drip as the fluid is drawn through the spigots. If four tanks are required instead of one, they should be constructed in a semicircular form, so that they may converge. Hembra is the name given to a larger tank, also constructed of masonry and close to those previously constructed, to receive the liquid drawn from them. This hembra must necessarily be lower than the machos. For this purpose a hole is dug in the earth, of the necessary dimensions, and the hembra solidly constructed in order to avoid the loss from leakage. Close to the hembra another small tank is constructed, and another, smaller still, at the side of this, is necessary for completing the operation of extracting the dyestuff. All of these apparatus may vary, according to the quantity of leaves to be treated, the condition of the soil in which they are constructed, and the pleasure of the individual planter; but whatever disposition may be made, the object to be attained is always the same. When the apparatus is ready, the manufacture of the indigo is begun.

Early in the morning the plants should be cut, in sufficient quantity to fill the macho or machos, and immediately conveyed thither and deposited in them. The receptacle is at once filled with water, completely covering the leaves, so that none will float on top. A sort of grating of cane is placed over the mass, and on top of this grating a weight of some kind—a rock will answer the purpose.

The infusion is allowed to stand until the following morning. In the first hour all of the leaves are removed from the machos, and the liquid tempered with a certain amount of lime of good quality, which is placed in a basket, the basket being shaken from right to left, or vice versa, until the lime has been spread over the entire surface. If a piece of stone should remain in the basket unburned, it is thrown away, and the operation just described is repeated with all of the machos. In a short time the lime will have been precipitated to the

bottom, carrying with it any stray leaf that may have remained, as well as whatever dirt there may be. The liquid is then withdrawn instantly from the machos into the hembra by means of a hollow cane. By opening the uppermost spigot the operator is able to see whether the liquid is clear and transparent, in which case the cane is attached to conduct the liquid into the hembra. Having drawn all the fluid through the first spigot, the second one is turned on, then the third, and so on until the last, and the same operation is effected with the other machos. While this work is being performed in the manufactory, other laborers will have cut a fresh supply of leaves, in the same quantity as those just used, which will be handled the same as those of the previous day. At the expiration of the second day the workmen commence to stir the liquid contained in the hembra. Three or four men, each provided with a spatula made of slender cane, to one end of which a small wooden tablet is attached, about one palm in length and three fingers in width, station themselves on the wall of the hembra and stir the liquid for at least an hour, when it is allowed to settle until the following day, care being taken to cover the receptacle with cloth or anything that will prevent the entrance of dirt or foreign matter into the liquid. On the following day, when the liquid in the hembra has settled, the first or top spigot of the hembra is opened in order to permit the outflow of a portion which has not yet assumed any color. This done, the machos are again emptied into the hembra as far as possible and the stirring is resumed. These operations are performed daily for eight or ten days, when they are suspended in order to extract the dye.

After a day, or preferably two days, of settling, all of the dyestuff contained in the liquid will have been precipitated to the bottom. The first spigot is then opened, then the others, successively, until the last, which is located the width of a few fingers from the bottom one, has been opened. Then the man in charge, or an intelligent laborer, descends to the bottom, and, while disturbing the liquid as little as possible, he collects it in a vessel, which he hands to another laborer standing above, who in turn hands it to another, this latter emptying the vessel into the next smaller tank referred to, and this work is continued until all the liquid has been collected.

On the following day new cuttings may be made, and all of the operations just described repeated, until the entire crop has been treated.

In from four to six days the dye in the smaller tank will have formed a sediment at the bottom, when all the water will be drawn off as was done with the hembra, and the dye will then be removed to the smallest tank. At the bottom of this tank is placed a frame made of cane, raised from four to six fingers above the floor of the tank; over this is stretched a clean cloth, upon which is thrown the dye. The water filtering through this cloth leaves the tank through a small hole in the bottom and is deposited in a small well close by. Since the water will at first carry with it some of the dyestuff, the operation of filtration should be repeated until the water flows thoroughly clean and transparent. By the following day all the water will have drained off, and the sediment remaining is made up into tablets or balls, fashioned by hand into the desired shape and size. These tablets or balls are then placed upon clean cloths, stretched upon a cane frame, and exposed to the sun, where they are allowed to remain until thoroughly dry.

When all the plants have been cut, the tanks should be covered and the utensils carefully put away to be used in the second cutting, which, if there has been some rain, will be as plentiful as the first, provided always that the rainfall has been slight and that it occurred before the plant brought forth many stalks; for when in this condition the rain may cause the production of a large amount of dyestuff. If the year be a good one, or if the rainy season is backward, a third cutting may be possible.

The cultivation of indigo was the source of considerable wealth in the Philippines, especially in Ilocos Sur, until 1883-84, when the producers began to adulterate it with sand and other substances so that its value in the market fell from 90 to 120 pesos per quintal to from 29 to 40 pesos per quintal, which brought about the ruin of this industry, the producers abandoning it and the market seeking its supply in other countries.*

* The decline of this industry in the Philippines is no doubt due in some measure to the manufacture of artificial indigo, which is produced from coal tar products, and which is always chemically pure, whereas the amount of available dyestuff of natural indigo varies from 20 to 90 per cent of the commercial products, due either to accident or adulteration in the preparation.—*Director.*

To-day an insignificant quantity is cultivated without any attempt to increase its cultivation, which would undoubtedly be done if the former price were paid. In Vigan to-day from 40 to 90 pesos per quintal are paid, according to the quality, and the greater part goes to the Chinese in Manila, and is used by them to dye their cloths.

The importance of this article should not be judged by the price paid for it to-day, but by that which it would command under good cultivation and proper care, which, as I have said, has reached 90 to 120 pesos per quintal.

The expenses of cultivation per hectare are as follows:

	Mexican.
First plowing-----	\$12. 00
Second plowing-----	9. 00
Third plowing-----	5. 00
Sowing the grain-----	2. 90
One plowing to kill the weeds-----	4. 00
Weeding and cleaning-----	4. 00
Total -----	36. 90

The expenses of labor, first cutting, are as follows:

	Mexican.
Four plant cutters for ten days, at 30 cents each per day-----	\$12. 00
Transportation to factory (according to distance): Four <i>cargadores</i> (carriers), who may be the same men used to do the cutting.	
Six cavans of lime-----	3. 00
One master workman in the business-----	8. 00
Water: Cost according to the distance from which it is brought, but generally it is brought by the cutters.	
Total -----	23. 00

The figures may vary quite materially, according to the localities, prices of labor, distances from the land cultivated to the factory, water facilities, etc.

The product of 1 hectare, supposing that there is a high grade of cultivation, good judgment in the choice of land, sufficient moisture at the beginning of the plowing, and good atmospheric conditions, should easily reach 4 quintals of dye of good quality.

DYEWOODS.

The forests of the Philippines abound in a great variety of dye plants and woods, which are largely used by the people in coloring the fabrics they weave from native and imported fibers. In addition to their domestic use, the exportation of dyewoods has been, in the past, a considerable branch of commerce, and their shipment is still carried on to some extent. In 1875 the value of dyewoods exported amounted to \$332,976, a sum which had never been previously reached and which has not been nearly equaled since, except in 1878, when their value was \$313,604. In 1895 the value of such shipments had fallen to \$13,828.

Since American occupation the only dyewood of which a record is given in official commercial reports is sapan wood, beginning with the last six months of 1900.

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The statistics covering the exportation of dyewoods, as far as available, are presented in the following table:

Quantities and values of dyewoods exported from the Philippine Islands during each calendar year specified: 1854 to 1902.

Year.	Quantity (kilos).	Value.		Per cent of total value of exports.
		Pesos.	Dollars.	
1854.....	1,629,579	86,566	38,731	0.58
1855.....	1,597,904	43,158	45,350	.71
1856.....	3,353,048	86,893	91,307	.95
1857.....	3,233,450	100,841	107,204	.85
1858.....	3,217,750	88,644	93,147	.94
1860.....	2,281,736	59,187	62,892	.62
1861.....	2,037,350	48,254	50,643	.60
1862.....	1,476,323	29,146	30,825	.32
1863.....	337,019	4,631	4,894	.06
1864.....	1,416,369	53,969	56,929	.51
1865.....	2,308,387	176,430	185,498	.84
1866.....	2,858,995	139,142	146,391	.63
1867.....	3,483,983	152,378	159,006	.69
1873.....	11,915,374	164,548	167,790	.70
1874.....	10,794,572	255,907	257,135	1.48
1875.....	11,405,574	341,084	332,976	1.80
1876.....	5,959,163	138,649	126,822	.93
1877.....	5,064,300	106,100	100,201	.65
1878.....	9,340,039	345,969	313,604	1.98
1879.....	8,114,094	167,620	148,025	.89
1880.....	6,018,374	176,250	168,590	.75
1881.....	4,453,350	58,231	51,808	.24
1882.....	4,790,480	116,408	108,871	.56
1883.....	3,342,000	69,965	61,050	.27
1884.....	2,792,186	51,383	44,834	.23
1885.....	4,359,950	73,539	61,390	.30
1886.....	5,039,198	86,569	67,686	.34
1887.....	2,898,220	32,680	25,151	.13
1888.....	7,002,613	119,380	88,150	.45
1889.....	4,294,387	80,538	59,176	.23
1890.....	2,765,445	43,715	35,942	.17
1891.....	3,206,914	142,112	110,322	.53
1892.....	4,220,109	64,052	48,863	.23
1893.....	4,942,575	94,966	58,243	.26
1894.....	3,861,992	69,851	34,842	.21
1895.....	1,620,981	26,907	13,828	.07
1896.....	(b)	(b)	-----	-----
1899.....	(b)	(b)	-----	-----
1900 ^c	(d)	-----	* 11,076	.06
1901.....	(d)	-----	* 38,850	.16
1902.....	(d)	-----	* 20,468	.07

^a Pieces.

^b Not reported separately.

^c Six months ending December, 1900.

^d Quantity not reported.

* Sapan wood.

[From Report of the Schurman Philippine Commission, 1900, vol. 3, p. 257.]

CHAPTER V.

PLANTS PRODUCING DYES.

* * * * *

DIVISION A.—DYE PLANTS.

Under this heading are included those plants which furnish to industry substances from which dyestuffs can be made. The cultivation of these plants has diminished greatly since the discovery of the aniline dyes which are to-day so much used.

INDIGO (ANIL) (INDIGOFERA TINCTORIA L.).

This plant, belonging to the family Leguminosæ, is a native of India, where it is found wild in many places and in others under cultivation. The juice extracted from its leaves and young stalks furnishes a blue dyestuff known as indigo, which is much used in the industries. The principal Philippine

provinces in which it is produced are Bataan, Batangas, Bulacan, Laguna, Pangasinan, Pampanga, Zambales, and North and South Ilocos. The latter province, even with a small crop, produces more than all the other provinces combined.

Besides the species already mentioned others are found in the Philippines, as *Indigofera trifoliata*, L.; *Indigofera trita*, L.; *Indigofera hirsuta*, L., the first two being cultivated.

Cultivation.—The indigo plant, called by the Tagalogs *tayum*, has small, slender, round leaves, whose tips are colored. It produces little slender pods full of seeds, by means of which it is propagated in the fields. Although this plant grows in temperate climates, two or three crops a year may be obtained in warm, moist climates as against one in the former. The most suitable grounds for the cultivation of this are those having light, deep soil, as the roots of this plant ramify but little, the central long root penetrating deeply into the soil. For this reason lands lying along rivers and small streams and at the foot of mountain ranges are most suitable for its cultivation, especially if they abound in alluvium. The land should be free from trees, so that the sun's rays are not cut off.

Under these conditions the juice of the leaves and young stems is more abundant. The soil should be deeply worked and fertilized by such substances as the residue of the indigo plant and others which contain organic matter, alkaline salts, phosphates and lime, such as refuse, ashes, etc. The seed is sown broadcast or in lines, the latter method being preferable, as it saves seed and facilitates weeding and irrigation. When the young plants are one month old the ground should be cleared of weeds, which deprive the plants of sustenance and of light and ventilation, all of which are so necessary to them. As the coloring matter is extracted principally from the leaves, these should be collected as soon as they are completely formed and before the fruit has formed. The indigo in the leaves is without color and in solution, and forms a part of the juice. When the juice is extracted from the plant it is yellowish white in color. On being exposed to the action of the air it changes successively to yellowish green, green, greenish blue, and finally, becoming insoluble, it falls as a blue precipitate, in the bottom of the vessels in which it is contained, about thirty hours after the extraction of the juice.

Uses.—Indigo is used for dyeing thread and cloth of cotton, silk, and wool and for coloring wood paper, etc. In commerce several varieties of indigo are known, of various values. Philippine indigo is of about the same grade as that of Coromandel and Madras, which is next to that from Bengal, the most highly prized, but on account of adulterations made by speculators, principally Chinese, who mix other materials with it, Philippine indigo is somewhat discredited and has suffered depreciation in price in the markets of the world. Nevertheless, this article is regularly exported to China, Japan, and Singapore.

RATTAN (SIBUCAO) (*CMSALPINIA SAPPAN* L.).

This is a plant of the family Leguminosæ, whose woody trunk produces a red coloring matter similar to campeachy or logwood, and which is employed in dyeing cotton or wool. It is very abundant in the forests of the Philippines, and some excellent varieties are found, which produce a color more highly valued than that of the Brazil woods. It grows naturally from the seeds which fall from the pod on the ground. Considerable amount of the dye is produced in the Philippine Archipelago, and it is an important article of export to China and England. The Chinese employ it in dyeing silks, damasks, and other fabrics woven in China. It is sometimes used in place of cochineal, though the color is not as stable.

SAFFLOWER OR ALAZOR (*CARTHAMUS TINCTORIUS* L.).

This is a plant of the family Compositæ, called also bastard saffron and in the Philippines *biri*. It is valued and cultivated for its stamens, which contain three principal coloring matters, two yellow, soluble in water and of little value, and the third red, soluble in the alkalies and of greater importance. It is used in the adulteration of saffron.

AGUISIP (*MELASTOMA POLANTHUM* BLUM.), AND BANCURIO (*MORINDA TINCTORIA* ROXB.).

These are two trees of the family of Melastomacæ and Rubiacæ, respectively. The natives extract from the bark of the former and the root of the latter a bright-red coloring matter which they use to dye pieces of hemp cloth.

which are then called pinayusas. To obtain the coloring matter from the bancuro the bark from the upper part of the large roots is taken off, dried, and reduced to a fine powder. In this condition it is called nino or cult. The operation of dyeing these pinayusas is thus described by Father Delgado, S. J.:

"The operation of dyeing these white squares on the cloth is very complicated and delicate. They are placed in little piles upon one another in a curious and admirable manner. Each one of the little squares before being dyed is tied with a thread of hemp, each blanket or piece of cloth requiring innumerable little threads or puyos, as they are called in the native language; the little threads once tied up in this way, the dye is applied to the whole piece, a little lime is added, and after the cloth has taken the dye all the little threads are removed. As the dye has not penetrated the little squares which were tied up these remain white, and form on the red background figures which give to the cloth the name pinayusas. The natives use this for making tents, curtains, and for adorning their houses."

BACAUAN (*RHIZOPHORA TINCTORIA* L.).

Shrub or tree of the family Rhizophoraceæ. These trees make up the mangrove swamps which are commonly found along the coast and near the mouths of rivers. They have extensive and impenetrable jungles, the refuge of mosquitoes, aquatic birds, and marine animals. From the bark a reddish coloring matter is extracted. The wood is much used as firewood.

BALANTI (*HOMALANTHUS POPULIFOLIUS* R. GRAH.) AND CUMALON (*DIOSPYROS CUNALON* A. DC.).

These are two trees of the family of the Ebenaceæ, the bark of which when dried and reduced to a powder furnishes a black coloring matter used by the natives.

SALICSICAN (*MORINDA UMBELLATA* L.) AND OTHERS.

The salicsican is a species of nino or wild bancuro, from whose roots the natives extract a red coloring matter which they employ in various ways.

The natives extract dyes from various other species of wood. From the bark of the tree called bagolibas a dye is obtained which will give any kind of cloth a fine, tawny color. The prepared bark of the tree called dayagao makes a fine mordant, which imparts a fine luster and great stability to cloth dyed black, yellow, or red. Belolo, dugna, and hagur are very much used by fishermen for dyeing and strengthening their nets, which take on a dark brown color and are rendered less susceptible to rotting. Ananaples (*Albizia procera* Benth.), of the family Leguminosæ, is used in dyeing hides which are to be used in the manufacture of whips, sole leather, and saddles.

**COMPILATION OF NOTES AND REPORTS ON
THE LABOR CONDITIONS IN THE
PHILIPPINE ISLANDS.**

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LABOR CONDITIONS IN THE PHILIPPINE ISLANDS.

[From Report of the Philippine Commission, 1902, part 1.]

THE LABOR QUESTION.

The complaint of the American and foreign merchants in these islands that the labor to be had here is altogether inadequate has become acute, and the chambers of commerce representing the American, Spanish, English, German, and other foreign interests have sent a representative to the United States to invite an amendment to the present Congressional legislation which extends the Chinese-exclusion act applicable to the United States to these islands, on the ground that it is necessary to admit Chinese for the business development of this country. On the other hand, it is quite apparent from the declarations of the federal party and other political organizations in the Philippines and from the vigorous manifesto of the only labor organization in the islands that there will be much opposition on the part of the Filipino people to the further admission of the Chinese. That this opposition has been chiefly due to the competition which the Chinese have offered in the matter of stores and trading is obvious to anyone who has looked into the question; but it would be unwise to infer from that that the introduction of Chinese as laborers here would not be a very unpopular policy on the part of the government.

The Chinese laborer becomes a merchant within a year or two after he reaches these islands, and then begins a competition with the Filipino tradesman which in the end drives the Filipino out of business. Were there unlimited Chinese immigration to these islands I do not doubt that the tendency would be to relegate the Filipino to the position which the Malay occupies in the Straits Settlements. Most of the avenues of business would be commanded by the Chinamen, as they now are in Singapore and the Straits Settlements, and the islands would ultimately become rather a Chinese country than a Filipino country. It is doubtless true that were the doors opened and the Chinamen allowed to come in freely it would tend toward a much more rapid commercial and industrial development of these islands than we are now likely to have; but in this respect I think the merchants and others interested would be disappointed in the trend which affairs would take. It has not been possible in Borneo to introduce the Chinaman into the fields; he has declined to become a farmer or a farm laborer in that island, and as the conditions are very similar to those which prevail here we may expect the same result. There are to-day, although there may be 100,000 Chinamen in the islands, but very few engaged either in farming or in laboring upon farms. The attention of the Chinaman is given either to coolie labor or skilled labor in cities or to the tending of stores and to commercial business. It is quite possible that the admission of Chinamen would reduce the wages of the stevedores, of the domestic servants, and of coolies in the cities, but there is grave reason for doubting how efficient the Chinaman may be in the carrying on of farming operations.

During the year 1902 there has been a movement for the organization of labor in the city of Manila which doubtless will spread to the other parts of the islands. It has been regarded, because of abuses which crept in, as an unmixed evil. I can not think it to be so. If properly directed it may greatly assist what is absolutely necessary here—to wit, the organization of labor and the giving to the laboring class a sense of the dignity of labor and of their independence. The labor organizations in the city of Manila are very much opposed to the introduction of Chinese labor, and their declarations upon this point will find ready acquiescence in the minds of all Filipinos with but few exceptions. The truth is that from a political standpoint the unlimited introduction of the Chinese to these islands would be a great mistake. I believe the objection on

the part of the Filipinos to such a course to be entirely logical and justified. The development of these islands by Chinamen would be at the expense of the Filipino people, and they may very well resent such a suggestion. The merchants and others who wish to invest here must take into consideration that labor is always likely for some time to be more expensive in these islands than it is in the United States per unit or product of labor.

Another phase of the labor question, which does not seem to have had its proper weight with the merchants of Manila in their demand for the admission of Chinese coolies, is the great obstacle which such a policy would present to the opening by the United States of its markets to Philippine products. The existence of cheap Chinese labor in these islands would furnish the strongest and most taking argument to those whose interests lead to their opposition to the reduction of the tariff, that the reduction would bring American labor and its products into direct competition with cheap Chinese labor and its products in these islands.

The evidence with respect to the efficiency and quantity of Filipino labor is quite conflicting. I append as exhibits (F 1 and F 2) to my report the reports of Major Aleshire and Captain Butt, in the quartermaster's department of the United States Army, who have had large numbers of Filipino laborers under their control and who have been quite successful in making them useful. I append also the report of the municipal board, and report of the city engineer of Manila, who has employed a great many Filipinos constantly, and whose evidence, generally, supports that of Major Aleshire and Captain Butt. I append also, marked "Exhibit F," the last report of the engineer upon the Benguet road, which shows very great discouragement in the use of Filipinos for the construction of public works in the country. I ought to add, on the other hand, that the manager of the Manila and Dagupan Railway Company has informed me that his road was constructed by Filipino laborers almost entirely, except that at one time they brought in quite a number of Chinese for the construction of bridges and the working upon the piers. The Chinese did not prove to be satisfactory, and Filipino laborers had to be substituted. On the other hand, the merchants of Manila claim that they find it very difficult to secure satisfactory labor or constant labor, and that the rates of wages are absolutely high. It is to be taken into consideration that these comparisons of wages and labor are made as to the efficiency with American labor, and as to reasonableness of price with the very low wages paid to Chinamen in Hong-kong. Everything is high in Manila. The cost of living is very high, and it is not surprising that the cost of labor should have risen. The very great increase in the foreign commerce and coastwise trade in these islands, together with the needs of the Army and the insular government, has caused a corresponding increase in the demand for all kinds of labor in and about commerce, so that the increase in wages and failure of the local labor supply are easily understood.

I do not think it would be just to the Filipinos, or a proper course for America in the development of this country, to do more than to extend to the Commission the power to admit, upon reasonable restrictions, a certain limited number of skilled Chinese laborers, who may contribute to the construction of buildings and the making of other improvements, and who at the same time by their labor may communicate to Filipino apprentices the skill which the Filipinos so easily acquire. Such skilled laborers might be admitted under bond of their employers that they shall be returned to China at the end of three or five years, the bond containing a provision also that for every Chinaman imported and employed a Filipino apprentice should be employed. Further than this it seems to me that it would be unwise to go. But such a provision would probably bring about the establishment of shipyards here and other enterprises that now are impossible in the Philippines because the proper skilled labor is not to be had.

I am myself by no means convinced that Filipino labor may not be rendered quite useful. The conditions of war and of disturbance throughout the islands for six years have led the men to form loafing and gambling habits and have interfered with their regular life of industry. Where such restlessness prevails industry is apt to be absent. The Filipino laborers must be given three or four years before an intelligent and just verdict can be pronounced upon their capacity for effective labor. I am confident that it will be greatly better than the suffering merchants of Manila anticipate.

A just view of the future of labor in these islands can not be taken without considering the dependent condition of the Filipino laborers in Spanish times. Much of the labor was then forced, and there was not a single circumstance

that gave dignity to it. The transition from such conditions to one where the only motive is gain must necessarily be attended with difficulty; but when the laborer shall come to appreciate his independence, when he shall know that his labor is not to be a badge of peonage and slavery, when American influences shall make him understand the dignity and importance attaching to labor under a free government, we may expect a great change for the better in the supply and character of labor.

EXHIBIT F¹.

FILIPINO AS A LABORER.

OFFICE ARMY TRANSPORT SERVICE,
Manila, P. I., November 4, 1902.

GOVERNOR: In compliance with your request per letter dated October 14, 1902, addressed to Maj. Gen. George W. Davis, U. S. Army, commanding Division of the Philippines, and pursuant to indorsements thereon from the adjutant-general and the chief quartermaster of the division, I have the honor to submit the following report upon the Filipino as a laborer.

My experience with Filipinos employed in any capacity dates from April 1, 1901, on which date I was assigned to duty in charge of the United States Army transport service, and the depot quartermaster transferred to me the employees pertaining to that office, among whom were the following: Fifty-one Filipino boatswains, or patrones, 76 Filipino engineers, 96 Filipino firemen, 6 Filipino oilers, and 258 Filipino sailors.

These Filipinos were employed as crews for the various launches and lighters in the transport service at Manila and as such may be considered as skilled labor.

In addition to the foregoing there were 55 Filipino bosses, 1,260 Filipino laborers, and 13 Chinese laborers.

Of these, 5 bosses and 250 laborers were employed on the quartermaster's docks and at the commissary warehouses. The remaining 50 bosses and 1,110 Filipino laborers were designated "bay laborers" (or "stevedores") and were employed on the bay in loading and discharging cargo exclusive of coal. The 13 Chinese laborers were employed in the freight-receiving room. The Filipino bosses, Filipino laborers, and Chinese laborers are considered unskilled labor.

The skilled labor was employed by the month and paid on the 15th and last day of each month at a rate fixed by the division commander, to which reference will be made later. These employees were under the charge of the master or patron of the launch or lighter to which they were assigned. When vacancies occurred other men were secured by the master or patron and were later employed by competent authority. It frequently happened that the launch masters or patrones would discharge members of their crews and secure other men to take their places. The assignments of crews to the launches and lighters were not regarded as permanent by the crews, and as a result they would exchange with crews of other launches and lighters without reference to the office.

It was understood that should launches be required for night service or on Sundays that the crews would receive double pay for the time so employed.

The stevedore or unskilled labor (Filipino bosses and laborers) was secured by employing the bosses, each of whom secured a gang of from twenty to thirty laborers. These men were employed by the day at a rate fixed by the division commander. They were paid daily through the bosses. Each boss was given a time slip stating the number of men in his gang and the time they had worked. These time slips were certified to as being correct by the superintendent of labor and were then presented to the cashier of the depot quartermaster's office by the several bosses, who received their own pay and that due the laborers of their respective gangs, whom the bosses paid.

Ten hours was considered a day's work for this class of labor, and when extra time, or night, or Sunday work was required the laborers received pay at double the rate for the time so employed, the bosses being given the time slips covering such time.

All coal pertaining to the transport service was handled under an informal contract, the rate per ton being 40 cents on the bay and 70 cents from lighters to coal piles, or from coal pile to lighter, the quartermaster's department furnishing all lighterage. The contractor employed Chinese labor for this work. This method of handling coal was adopted because it was thought Filipinos could not do this class of work, which is considered heavier and harder than the handling of cargo to and from ships and lighters. This system was continued until May

1, 1901, on which date the reorganization of the employees of the transport service was in effect so far as practicable, to which only such reference will be made in this report as involves changes in system of handling the Filipino and Chinese employees.

The organization of the launch crews was completed and each crew was assigned to a particular launch. A list of the crew in each case was prepared and entered in time books, of which there was one for each launch. Timekeepers visited the launches at irregular intervals, verifying the crew, and the crews were in this way made to understand that this assignment was permanent, and that they were employed to work on that launch and nowhere else unless specifically assigned by the officer in charge of the transport service. Each launch was given a number, and all property and tools were inventoried and stamped with the number of the launch, all in the presence of the launch master or patron, who was then required to sign a receipt for same. This property was verified monthly with the view of collecting the value of any shortage at the next payment. The Filipinos understood this and soon appreciated the necessity of looking after property for which they were responsible. All employees of the launches were required to comply with the regulations for launch service, a copy of which was furnished the master or patron of each launch and lighter.

It was explained to all crews that they were employed by the month, and would receive no pay for days on which they were absent, no extra pay for night or Sunday work, for which launches were specially designated when necessary, and were not required for service the next morning. This practice continued for about four months, at the expiration of which time all launches were required to work whenever called upon.

The system of semimonthly payments was discontinued June 30, 1901, from which date payments were made on the last day of each month on a pay roll prepared for each crew. There were no complaints made by the launch crews when these changes were made.

The number of Filipinos employed as crews of launches and lighters at Manila varies from time to time because of the constant changes in the launches at this port, due to their being assigned to stations elsewhere. The records of this office show that on June 30, 1901, there were 433, and October 31, 1902, 472 Filipinos employed as launch and lighter crews, rated as skilled labor, and which are classified as to duties and rate of pay as shown in the following table:

Occupation.	Rate per month, United States currency.	On rolls.	
		June 30, 1901.	Oct. 31, 1902.
Engineers.....	\$50.00	2	—
Do.....	40.00	8	7
Do.....	37.50	10	7
Do.....	35.00	6	5
Do.....	32.50	14	7
Do.....	30.00	—	8
Assistant engineers.....	50.00	—	3
Do.....	40.00	3	1
Do.....	30.00	4	7
Do.....	27.50	12	7
Do.....	25.00	5	5
Do.....	22.50	4	7
Do.....	20.00	1	—
Others.....	20.00	2	4
Do.....	15.00	1	—
Firemen.....	20.00	4	—
Do.....	17.50	2	—
Do.....	15.00	73	80
Boatswains.....	50.00	2	—
Do.....	40.00	3	2
Do.....	37.50	12	4
Do.....	35.00	6	6
Do.....	32.50	4	6
Do.....	30.00	15	9
Do.....	22.50	5	2
Do.....	20.00	16	11
Quartermasters.....	12.50	41	42
Sailors.....	15.00	24	22
Do.....	10.00	196	177
Cooks.....	16.00	—	3
Waiters.....	7.50	—	1
Total skilled labor.....	—	472	433

Of the launch crews on the rolls of this office, it is found from inspection of the time books that from June 1, 1901, to October 31, 1902, 91 per cent of the patrones have been continuously in the service, 5 per cent have resigned, and 4 per cent were discharged; 89 per cent of the engineers, firemen, and oilers have been continuously in the service, 8 per cent resigned, and 3 per cent discharged; while only 11 per cent of the sailors have been continuously in the service, the remaining 89 per cent resigning after about three months.

The efficiency of the launch crews, both in the engine and dock departments, has gradually improved to such an extent that within the past two months it has been deemed for the best interests of the service to replace American and European launch masters, who have been discharged for cause, by Filipino patrones, who in all cases have performed their duties as such without accident or delay and to the entire satisfaction of this office.

All bosses and unskilled (or stevedore) labor were employed as individuals by this office. They were organized into gangs of one boss and fifteen or twenty laborers, and the gangs numbered consecutively from 1. Gangs Nos. 1 to 15, inclusive, were designated as regular gangs, and all others as emergency gangs. Each boss was furnished with a time book, bearing the number of his gang, in which was entered the names of the boss and all of the laborers. The bosses were required to keep and verify the time of their respective gangs, under the supervision of American timekeepers, stevedores, and cargadores, under whose direction they worked. These time books were turned in to the general time-keeper every evening, when the gangs were dismissed, after verification, and returned to the bosses every morning, when they were verified before going to work. They were informed that they would be employed by the day; that on May 15 the daily payments would be stopped, and in lieu thereof they would be paid on the 15th and last day of each month, to include June 30, 1901, after which date they would be paid monthly (on the last day of each month), and only for such time as is shown by the time book, and that no double pay for night or Sunday work would be allowed. They were further informed that the regular gangs would first be given employment and that such additional labor as might be required would be proportioned among the emergency laborers in such manner as to give all an equal share of the emergency work. The advantage to both the employer and employees of regular attendance, without which no permanent or organized labor could be had, was explained to all concerned, and that the men who worked the best and lost the least time would be placed in the regular gangs as vacancies occurred.

Notwithstanding some of the changes may be considered radical, they were accepted by the Filipinos without complaint or comment, and work was commenced on May 15, 1901, under the organization and system of instruction briefly outlined above, each gang under the supervision of an American stevedore, cargador, wharfinger, or checker.

This Filipino labor handled all cargo, except coal, received and shipped by this office and coaled all launches and steam lighters.

All coal, except that required for launches and steam lighters, was handled by contract at a stipulated price per ton, or by Chinese labor employed by this office at 75 cents United States currency per day, and double rate for extra time and night and Sunday work. In view of the high wages demanded by the Chinese, and the cost by contract, the employment of Filipino labor for the handling of coal was commenced July 1, 1901. Laborers were employed at Cavite for work at the coal deposits at Sangley Point, and supplied from the regular and emergency gangs employed at Manila for coal work on the bay. This labor did well from the first, and while only a small proportion of the coal work was done by Filipinos during the month of July, 1901, they handled more than one-half of the coal in October, and have practically handled all coal since December, 1901.

The quantity of coal handled each month by contractors, Chinese labor and Filipino labor, with the cost in each case, the number of Chinese and Filipinos employed by this office, the rate of pay, number of days employed, the average number of tons handled per man per day and cost per ton, are shown in the comparative statement herewith inclosed, marked "A." From this statement it will be noted that the cost per ton was less and the average per man per day greater with Filipino labor than with Chinese labor or contract.

The records of this office show the average number of Filipino stevedores employed each day, including Sundays, holidays, and fiestas, during the fiscal year ending June 30, 1902, to have been: Fifty-seven bosses, at \$30 per month, amounting per day to \$58.22; 906 laborers, at 50 cents per day, amounting per day to \$453, or a total average daily cost for labor of \$509.22.

During the same period there were transported to and from Manila :

Passengers and troops.....	97, 106
Animals.....	1, 609
Baggage, cabin passengers'.....pieces.....	63, 061
Estimated weight of these 63,061 pieces baggage.....pounds.....	6, 306, 100
Estimated weight troop baggage and property (not manifested), pounds.....	12, 000, 000
Mail, 22,011 sacks, estimated weight.....pounds.....	1, 540, 770
Freight, 3,813,200 packages, estimated weight.....do.....	352, 119, 263
Coal.....do.....	386, 691, 626

Making a total of..... 758, 657, 759

of which 91,627,694 pounds were handled by contractors and Chinese labor and 667,030,065 pounds by the Filipino labor above referred to.

That a clear understanding may be had of the amount of work actually done by this labor during the entire fiscal year in handling this freight, attention is invited to the fact that where cargo is received it is first taken from the vessel and placed on lighters, then from the lighters to the dock, and from the dock to the various store houses. Subsistence stores, after being placed on the dock, are separated and transferred by lighters to the various storehouses. Where coal is stored in deposits at Cavite or on the Pasig River, it is first placed in lighters and taken ashore, then carried in baskets and dumped on coal pile. Where vessels are coaled from coal deposits, coal is carried in baskets from coal piles to lighters and from lighters placed aboard the ship, then moved again into the bunkers, where it is trimmed. It will, therefore, be noted that all this freight, including baggage, coal, and forage, was handled at least three times, and that there were actually handled during the fiscal year by Filipino labor on an average of 2,741.1 tons per day, or 3.02 tons per man (laborer) per day at a cost, including the wages of the bosses and laborers, of 18½ cents, United States currency, per ton for labor, not including stores handled for other departments by the same labor.

To avoid the delay incident to the quarantine of vessels at this port because of Asiatic cholera, a quarantine station was established on the bay from which to load and discharge all cargo and clear all ships pertaining to this office.

On April 1, 1902, 12 Filipino bosses and 240 laborers were sent to this quarantine station for duty, where they remained until June 5, on which date the quarantine station was abandoned because of cholera among the laborers. From time to time during this period the number of laborers was increased until the average number was 350. During this time these Filipino bosses and laborers remained in quarantine, working day or night as their services were required without any increase in wages other than a Filipino ration. They were brought ashore occasionally, by authority of the quarantine officer, to procure a change of clothing. That they might be held in quarantine, each gang as it came ashore was placed in a wagon and under the charge of an American employee sent to their homes, where they received their clothing without leaving the wagon, and returned to the quarantine station.

The records show that during the months of April and May, 76,276 tons of freight, exclusive of coal, were handled by an average of 350 Filipino bosses and laborers. No laborers could have worked harder or been more loyal than these Filipinos during the time referred to.

From an inspection of the time books it is found that of the 685 regular Filipino laborers employed 316 had twelve months' continuous service, 189 had eleven months' during the fiscal year, 102 had ten months' during the fiscal year, 70 had nine months' continuous service, 8 had eight months' continuous service.

The emergency labor, considering the time it was required, averaged from 90 to 95 per cent in attendance.

Attention is respectfully invited to the reports of Capt. F. A. Grant, Q. M., U. S. Army; Capt. H. W. French, Q. M., U. S. Army; Mr. Adam Neder, in charge of coal, and Mr. W. B. Moses, in charge of labor, herewith inclosed and marked, respectively, "B," "C," "D," and "E."

In conclusion, the following replies are submitted to your inquiries:

1. The number of laborers employed averaged daily 57 bosses and 906 laborers during the fiscal year ended June 30, 1902.

2. They are classified only as dock, river, and bay stevedores.

3. Each class handles baggage, freight, and coal received and shipped by this office.

4. The only skilled labor employed are patrones, engineers, oilers, firemen, and sailors. Their classification and rate of pay are fixed by the size of the launch to which they are assigned.

5. The wages are: For patrones, from \$50 to \$20; engineers, \$50 to \$32.50; assistant engineers, \$40 to \$20; oilers, \$20 to \$15; firemen, \$20 to \$15; sailors, \$10; bosses, \$30 per month; laborers, 50 cents per day.

6. All Filipino employees are paid at the end of each month for the number of days present during the month.

7. There is no difficulty in securing good labor.

8. The laborer works from 7 a. m. to 12 m., and from 1.30 p. m. to 5.30 p. m., and, under emergencies, whenever required, with no extra pay for Sunday or night work.

9. This labor is very efficient.

10. Chinese labor was formerly employed for the handling of coal, but has been abandoned and replaced by Filipino labor, which, by practical tests during several months, averaged more tons per man per day and at a much lower rate per ton.

I prefer the Filipino labor employed by this office to Chinese.

11. The attendance of Filipino laborers has been and is excellent. They do not absent themselves after Sundays, holidays, or fiestas, nor during any such days should they be notified in advance that they will be required for work. Their physical strength is much improved and they are capable of doing as much and as hard work as any laborers we have had in the Orient.

Very respectfully,

(Signed.) J. B. ALESHIRE,
Major and Quartermaster, U. S. Army,
In Charge Army Transport Service.

HON. WILLIAM H. TAFT,
Governor of the Philippine Islands, Manila, P. I.
(Through military channels.)

OFFICE ARMY TRANSPORT SERVICE,
Manila, P. I., October 24, 1902.

Maj. J. B. ALESHIRE,
Quartermaster, U. S. Army, in Charge Army Transport Service,
Manila, P. I.

SIR: I have the honor to make the following report in regard to the native labor employed by this office for handling freight of all classes consigned to and shipped by this office:

When Manila was first occupied by United States troops in August, 1898, we were informed by business men who furnished labor for loading and unloading freight of ships and handling same on shore that it was impossible to secure Filipino labor, and that Chinamen were used for that purpose, as the Filipino would not work. We found this to be practically true at that time, as it was very difficult at times to procure enough labor on account of this fact to handle Government freight, so that for nearly two years after the arrival of our troops on the island much of the troop baggage and some freight were handled by soldiers.

Subsequently Filipinos were employed and competent American stevedores placed in charge of them to teach them how to work. The result of this action has been wonderful, and to-day this office is handling freight cheaper than it was possible to handle it with Chinese labor in the early years of occupation.

In May of the present year Filipino labor unloaded one ship at Calle Principe wharf and loaded her in nine hours, at a cost of 7½ cents gold per ton.

The records of this office will show that the U. S. A. T. *Dix*, 10,500 tons measurement, was unloaded in Manila Bay and the freight stored in the lighters in ninety hours, at a cost of 12 cents gold per ton.

During the same month I was present at the United States army corral when 30 Filipino laborers unloaded from a large steel lighter and passed through one side port of the U. S. C. T. *Francisco Reyes* and stored it, 1,600 packages of freight in just one hour.

While the above records may be called exceptional cases it will show what can be accomplished by native labor when required of it.

The labor used by this office is thoroughly organized, there being gangs of 20 men each under charge of a native boss. In discharging a ship one gang is usually placed at each hatch—the boss and three men remain on deck; the

remainder go below, break out, and sling the freight ready for hoisting from the holds.

One American stevedore is in direct charge of the unloading of each ship.

The difference between this way of handling freight and the way it is handled by commercial firms is quite noticeable. One reputable firm of stevedores in this city has a native woman employed as stevedore, while other firms have no stevedore of any kind in charge of their labor; and, upon investigation, I have found that they do not take out freight either as fast or with as little breakage as our employees do under the method outlined above.

As freight consigned to this office and carried by commercial liners is unloaded and delivered to us over ship's side by stevedoring firms, we have had an opportunity to compare the difference between native labor handled by American stevedores and that labor under charge of native stevedores or no stevedores at all.

Our men leave this dock at 6.30 a. m. daily, and at 7 a. m. are at work. They stop at 12 noon and are at work again by 1.30 p. m., quitting at 5.30 p. m. Should it be necessary to work them at night or on Sundays they receive the same rate of pay as for regular hours. If required to work an hour or so overtime to complete the work on a ship, they do so willingly, and without extra pay, although it must be remembered that they are taken from this dock in the morning and returned to shore the same night by launch; they are not required to work an hour in a banca to go to work and another hour to return at night.

It is my experience that Filipino labor is much more satisfactory in every way than Chinese labor; it is not so expensive, and we can accomplish more in a day with natives than can be accomplished in the same time with an equal number of Chinese.

It is my opinion, as well as of our stevedores, that 15 of our native laborers will discharge or load more freight in one day than any equal number of Chinese that have ever worked for this department.

If a man should be injured while working for this department he is sent to the hospital and cared for until he recovers. This right to hospital treatment and feeling of security as regards steady employment, together with fair treatment, seems to appeal to the men, and I have experienced less trouble in controlling them, with as good results, so far as work is concerned, as I have had with any other labor during my lifetime.

Regarding Chinamen, my experience is that while most of them work well, at the same time they are ready to take advantage of a rush of work and ask for a higher rate of wages, and, should their request not be granted at once, will leave their employment, even though they may have been a long time in your employ and have been well treated. This has been the experience of this department.

During the early days of the late cholera epidemic, and when we had a large number of transports and about 50,000 tons of freight per month to handle, in addition to troops and troops' baggage, our Filipino labor worked faithfully day and night, at times not seeing their families for weeks, and not knowing whether they were alive or dead. I am sure Chinese would have taken advantage of the occasion to demand higher wages.

Very respectfully,

F. H. GRANT,
Captain and Quartermaster, U. S. Army,
Assistant to Officer in Charge Army Transport Service.

OFFICE ARMY TRANSPORT SERVICE,
SHIPPING DEPARTMENT,
Manila, P. I., October 28, 1902.

Maj. J. B. ALESHTRE,

Quartermaster, U. S. Army, in Charge Army Transport Service,
Manila, P. I.

SIR: In compliance with your oral instructions regarding my observations as to the merits of Filipino and Chinese labor to the best interests of this department, I have the honor to submit the following report:

Of the several hundred Filipino laborers employed daily in loading and unloading the ships, those who have been longest in employ work more rapidly and handle cargo more carefully than the emergency crews employed for two

or three days when more than the usual number of ships' cargoes are to be handled. But even these emergency men work better the last than the first days. They display a desire for permanent employment. There is never any difficulty in procuring all the labor required.

The Filipino seems ready and willing to learn the improved methods of performing labor and displays considerable ingenuity in handling heavy packages. It has often been observed when an unusually bulky or awkward package is to be handled they advance ideas to each other as to the way of procedure. An American overseer, though not able to speak their language, will show them by signs a simple way. They immediately adopt it and do not have to be instructed a second time.

During the recent epidemic of cholera, when ships have been held in quarantine from three to five days, it has often been necessary to work overtime and occasionally all night. This the Filipino has cheerfully done.

There is but little so-called skilled Filipino labor in this department, confined chiefly to the engineers on the launches. They take good care of the machinery and seem to understand the principles of its construction to such an extent that minor "breakdowns" in the machinery are often repaired with crude tools in a rapid and ingenious manner.

The crews of all launches pertaining to this department are Filipinos under American launch masters, except some of the smaller ones, which have Filipino masters who have a sufficient knowledge of the English language to carry out instructions given in English. So far as navigating is concerned, it is believed the Filipino is capable to master them, but from lack of knowledge on the part of Americans of the native dialects, it is necessary at present, and will be for some time to come, to have many American masters, but they may gradually be replaced by Filipinos who have learned sufficient English to carry out orders without first having them translated. Most commercial launches are entirely manned by Filipinos, because the commercial companies well established have been here sufficient time for their representatives in the supervision of this class of labor to have acquired a knowledge of Spanish or native dialects. This has not been practicable for Americans, as their energies, especially the military, have been needed in other ways than the acquirement of foreign languages; but it must be said in justice to them that unusual advancement has been made in this direction by our American overseers, and the Filipino also deserves credit for the strides he has made in the acquirement of our own language.

But few Chinese are employed in this department, from which comparison may be drawn. These are employed, moreover, in loading and unloading small packages from the wagons at the storeroom. All the heavy work is performed by Filipinos. If new methods of handling cargo are presented to the Chinese, they sullenly accept it for the time being and immediately revert to their own methods. They are great consumers of opium, which seems to be as necessary to them as tobacco to the Filipino, but the effects produced leaves them stupid and weak; they object to working overtime without large compensation; they do not display a desire to acquire a knowledge of any other language, making it difficult to give them instructions. There seems to exist a national hatred between the Chinese and Filipinos. The average Filipino will not work under Chinese bosses, or acquire their methods, but seems anxious to learn from Americans.

I have never known of fights occurring between American and Filipinos or American and Chinese labor, but between the Chinese and Filipinos they are frequent, utilizing anything convenient as weapons. The altercations starting between two individuals often result in ten or a dozen of each class becoming engaged before police or American overseers can separate them. All this expended energy and time would be saved were they never put to work side by side.

It is earnestly hoped the Filipino labor of this department may not be supplemented by Chinese. Should it ever have under its control shops, dry docks, or marine railroads, it is believed better satisfaction would be obtained from the Filipino apprenticed under carefully selected American foremen than by Chinese. The Filipino under the Chinaman will only bring discord, indifferent results, and no improvement to the Filipino's natural ingenuity and desire to improve.

In closing it might be stated that the Filipinos permanently employed in this department have not changed in their shifts more than would be expected from American labor of the same class for over a year, and the percentage of attendance of permanent laborers is constantly increasing. Formerly it was difficult

to get regular attendance on "feast days," but that has almost if not quite entirely disappeared. They seem satisfied to enjoy the regular holidays observed by Americans.

Respectfully submitted.

H. W. FRENCH,
Captain of Infantry, Quartermaster, U. S. Army,
Assistant to the Officer in Charge Army Transport Service.

MANILA, P. I., October 23, 1902.

Maj. J. B. ALESHIRE,

Quartermaster, U. S. Army, in Charge Army Transport Service.

SIR: I have the honor to inform you in reference to Chinese and Filipino labor. I have worked Chinese in Cavite coal yard, loading and unloading coal.

I find that in handling them they will not work unless every hour or so they are allowed to stop for rest to smoke about fifteen minutes, and they want from 12 to 2 p. m. for lunch hour.

The number of tons they unload per man do not exceed from 1½ to 2 tons, and at \$1.50 Mexican per day they are more expensive than Filipino labor.

They will not work nights or Sundays unless double pay is given them.

The employment of Filipino labor at 50 cents gold per day and only one hour for dinner, and who will work nights and Sundays if necessary at same rate of wages, will load as much or more coal per day.

When I worked Filipino labor in Cavite yard at 50 cents gold per day they averaged 2 tons per man, and sometimes from 2½ to 3 tons, according to distance. Chinese never averaged over 1½ to 2½ tons per man per day.

As for bay loading, I find the Filipino average for loading and trimming is 1½ tons per man for the past three months.

My opinion is that the Filipino labor is the cheapest and the best.

Very respectfully,

ADAM NEDER.

OFFICE ARMY TRANSPORT SERVICE,
 Manila, P. I., October 21, 1902.

Maj. J. B. ALESHIRE,

Quartermaster, U. S. Army, in charge Army Transport Service,

Manila, P. I.

SIR: I have the honor to make the following statement relative to the employment of native labor by this department and under my supervision. I wish to state that I have at all times found the native laborers regular in attending to their duties.

There is employed by this department from 500 to 1,000 native laborers, and I have found that fully 95 per cent of these men worked every day that there was work for them to perform, and when laid off for lack of work were always ready and willing to return to their duties when this department needed their services.

I further state that my experience with labor has proved to me that in many ways the native laborers are superior to Chinese laborers, providing the natives are handled in a proper manner.

The majority of the native laborers employed by this department at the present time under my supervision have been so employed for the past year, and I have never had any trouble in getting these men to work Sundays, holidays, and late at night when it has been necessary for work to be done.

Very respectfully,

W. B. MOSES,
In Charge Native Labor and River Stevedores,
Under Direction of Maj. J. B. Aleshire, Q. M., U. S. Army.

A.

Statement of coal handled by contracts, Chinese labor, and Filipino laborers, July 1, 1901, to June 30, 1902, army transport service, Manila, P. I.

[Rate and cost in United States currency.]

	By contract.				By Chinese labor.								By Filipino labor.								Average tons per man per day.			
	Pounds.	Rate per ton.	Total cost.		Day work (average).			Night work (average).			Cost.	Pounds.	Cost per ton.	Average per man per day in tons.	Bosses (average).			Laborers (average).				Cost.	Pounds.	Cost per ton.
					Men.	Day.	Rate.	Men.	Day.	Rate.					Men.	Day.	Rate.	Men.	Day.	Rate.				
July, 1901	16,213,200	80.	\$5,066.69													2	541.00	71	590.50	\$187.50	1,012,286	\$0.4150	1	988
August, 1901	22,077,441	58	5,516.48	98	480.76	43	431.50	\$552.00		978,880	\$1.26	0.81	4	12	1.00	100	12	50	648.50	3,081,896	1,927	2	691	
September, 1901	2,720,413	69	888.30	151	7	.75	55	7	1.50	1,870.25	4,592,000	.663	1.44	8	41	1.00	68	41	50	1,658.00	14,421,811	2,025	2	1,004
October, 1901	5,967,360	64	1,704.96	48	4	.76	100	4	1.50	588.00	2,665,600	.494	2.44	8	20	1.00	153	20	50	1,780.00	14,309,029	2,708	2	1,150
November, 1901	7,250,240	56	1,815.04											10	20	1.00	153	20	50	1,780.00	14,309,029	2,708	2	1,150
December, 1901	9,094,400	49	1,989.40											14	29	1.00	298	29	50	4,727.60	89,040,901	2712	1	2,060
January, 1902														14	26	1.00	285	26	50	4,069.00	28,068,986	8239	1	1,866
February, 1902	4,928,000	51	1,122.00											15	27	1.00	298	27	50	8,496.50	27,919,132	2806	1	1,971
March, 1902	10,402,560	41	1,904.04											12	28	1.00	885	28	50	6,726.00	88,942,482	8778	1	806
April, 1902	4,787,600	41	867.15											10	24	1.00	290	24	50	8,720.00	82,180,432	2598	1	2,217
May, 1902														10	21	1.00	265	21	50	2,992.50	82,090,996	2098	2	1,075
June, 1902														8	25	1.00	160	25	50	2,200.00	21,729,344	2314	2	739

EXHIBIT F^a.

PHILIPPINE LABOR.

OFFICE LAND TRANSPORTATION AND GOVERNMENT CORRALS,

Manila, P. I., October 24, 1902.

GOVERNOR: In compliance with your letter to Maj.-Gen. George W. Davis, U. S. Army, requesting certain information from me regarding Filipino labor, I have the honor to state:

That during the month of September, 1902, an average month in the matter of labor in this department, I employed 941 Filipino laborers.

That of the labor regularly employed the percentage of time lost shows only 3½ per cent, or an attendance of 96½ per cent. Whereas all labor was formerly paid by the day and week, it is now paid monthly.

That I am able to secure all the labor I need at 40 cents and 50 cents United States currency per day.

This labor is classified into the following classes, to wit:

		United States currency.
Farriers	per month	\$30.00
Teamsters	do	20.00
Packers	do	18.00
Saddlers	do	17.00
Trimmers	do	14.00
Painters	do	14.00
Carpenters	do	14.00
Stevedores	per day	.50
Ordinary labor	do	.40

The nature of work which each class performed is readily recognized under the headings as classified.

As far as possible I have adopted practically the civil-service rules in handling Filipino labor in this department, my effort being to arouse the ambitions of the various Filipinos who might be classified as skilled laborers.

The native farrier receives more pay than any other class of native labor in this department. There are four of these farriers in this department, and they have practically taken the places of American veterinary surgeons who have been transferred to the line or returned to the United States. Under the guidance of competent American veterinarians they have made marked advances in this profession, and are capable of treating intelligently certain hoof diseases and diseases of even more complicated character without direction.

The teamsters are the next highest paid in this department. In my report made to the chief quartermaster of the division in 1901 I expressed the opinion that while native laborers were capable of great proficiency, yet they would never be able to handle the American animals. Since then I have had occasion to change my mind. Upon receiving authority from the chief quartermaster, I broke in a number of natives to drive the coal and sanitary carts. They are not only honest and faithful in the performance of this work, but remain in the department after hours, so I am told by the superintendent of the corral, to keep their harness greased and clean, their animals curried, and their carts washed. I never found dishonesty among the drivers in the delivery of coal and wood, and I now believe the Filipino native capable of handling the escort wagon wherever the animal is at all well broken. The superintendent of the corral reports to me that there are less accidents and runaways in the train handled by native teamsters than that handled by American drivers. The cause is apparent. The American drivers to a great extent is reckless and oftentimes careless. The position of teamster is greatly sought after in this department by native, and they use every caution and are diligent in the performance of their duties in order to retain their positions. Of the 45 native teamsters in this department during the month of September, 1902, only 7 days' labor was lost. The native is docked if he is not present every morning and evening, and if he does not give a satisfactory explanation is discharged.

It is in the saddler, paint, and wheelwright shops that more skillful labor is required of the native and where he attains a greater degree of proficiency than in any other branch of this department. In the finest work in the wheelwright shop—such as the repairing and rebuilding of vehicles like carromatas, quilleses,

and carriages—he becomes an expert and almost surpasses any laborer which we can put upon this class of work.

While the American wheelwright gets \$85 per month, the native starts with \$14, until now there are four of them who have reached a salary of \$30 per month. Their work is of the highest order, and the foreman of the wheelwright shop is undertaking to break in and train up additional Filipino laborers on account of their constancy in work and the good class of work they turn out. I believe the native wheelwright is capable in time of doing all repair work of a casual character that is needed in these islands.

All work in the paint and trimming shops is exclusively done by native laborers under a white foreman. When I assumed charge of this department all painting was done by Americans at \$75 per month. While painting is not difficult workmanship, yet when carried to a degree of efficiency as in the paint shop of this department the Filipino reaches a high rank in skilled labor. The same is equally true of the trimmers. All of the upholstering and covering of Dougherty's wagons, ambulances, and carriages, as well as carromatas, quilleses, etc., is done exclusively by native labor.

In the past I have made great efforts to secure white labor for this branch of work, but was never able to find more than one or two white laborers. The native laborers in the trimming shops, who handle the big sewing machines, as well as doing hand sewing, stuffing, cutting, and trimming, are men who were trained to this work either in this department or at the pony corral. I have had some trouble in retaining this class of labor. As carriage factories would open in Manila they would make a bid for the labor which had become efficient in this department in this class of work, and frequently the best men left this department, being able to secure higher wages elsewhere. This, however, is not a discouraging sign; if any indication at all, it should be to the contrary.

There seems to be no hostility between the skilled American labor in this department and the skilled Filipino. In fact, I have been surprised to see how readily the foremen of the various shops carry out my wishes in this matter in endeavoring to teach and train the Filipino in the various branches of work.

In the unskilled labor this department has been very fortunate in its handling. As an illustration, during September, 1900, all of the storehouses in the department were practically swept away by a typhoon, and native carpenters were very hard to get on account of destruction in other parts of the city and the increased demand for them. I then resorted to the unskilled Filipino labor at 40 cents a day, putting one white man to each forty in rebuilding the storehouses and corral. It was during the height of the rainy season, and it was done with remarkable rapidity and without loss to any property which had been unroofed. Since then any building which has been done in this department has been handled by white foremen and Filipino unskilled labor.

The vast storehouse now being built under contract in this department is wholly done by natives with American foremen. I have carefully noticed from day to day how well they perform this labor and have seen no evidence of loafing or incapacity in handling the heavy timbers.

The foreman of the wheelwright shop reports in most favorable terms upon the native in setting joists and in handling the saw, plane, level, etc.

Filipino laborers are never allowed to be idle in this department. The forage gang, for instance, when there is no forage to handle, is put to policing the corral or rebuilding the roads. This is equally true in the coal department.

When I first assumed charge of the department of land transportation all the coal in the quartermaster's department was on my papers and handled by me. The work was done at that time by Chinese. I had difficulty, as I thought, in securing proper results from Chinese labor. I then began an experiment of having the Chinese unload the coal on the dock and the Filipinos carry it from the dock to the coal pile, which was the long run. The results were so satisfactory that the next month I replaced all Chinese labor in this department by Filipinos, and found that the work was not only done as rapidly, but much cheaper.

The work in this department is not of a like character. The transportation which arrives here from the States is ponderous and is difficult to handle. Much of the hardware in the quartermaster's department, such as bar iron and steel anvils, horse and mule shoes, nails, tools, etc., are handled in this department and are unloaded and stored by native labor. All stores of whatsoever character, wagons, trucks, parts of same, forage, paints, oils, etc., are all handled

by natives exclusively. Packing boxes are made and repacking of all supplies is done by natives. In fact, with the exception of the teamsters, wagon and assistant wagon masters, foremen and blacksmiths, this entire department in the matter of stores, receiving and shipping, is done by natives.

Forage weighs heavy and is hard to handle. The smallest bale of hay weighs 125 pounds and the compressed bales weigh 260 pounds. The oats average 100 pounds per sack. All hay in this department is piled to great heights. The Filipino takes the lighter bale on his shoulders and carries it over a hundred feet in the air, never putting it down until it reaches the point where it is to be laid, returning for another trip and continuing with little show at skulking. In the case of the larger bales two handle them, or else they are passed from hand to hand. This labor gets 50 cents gold per day.

The other labor throughout the storehouses and that which tends to extra stock, waters and feeds the animals, and polices the corral, is rated at 40 cents gold per day.

When I first assumed charge of this department in August, 1900, all labor was paid by the day, except in a few cases where it was paid weekly. I did not believe it possible at that time to pay them any differently, or that they would accept new conditions. It involved a vast amount of labor and had a demoralizing effect upon the Filipinos themselves. At that time all labor needed was secured through patrones or bosses. While I and other quartermasters in the city would pay the native himself for the work performed, he would in turn put it in the hands of the patron, who would extract a certain percentage, giving him the balance. This was the hardest problem which we had to meet; if we attempted to prevent it, the patrones would prevent us from securing labor. On two occasions all the loading and unloading in this department had to cease because I discharged the patrones and stationed guards to prevent laborers from giving their pay to the patrones. A continuous warfare on this system of an anterior date has now resulted in a complete alienation of laborer and patron as far as this department is concerned. The Filipino has become thoroughly convinced that not only is he independent of the patron, but to be subservient to him is against his interests. I believe this was largely brought about by paying the labor first once a week, then twice a month, and later on monthly.

Tagalog and Spanish interpreters would tell them, as they were paid, not to give up any of their money to anyone, and that they could always get work here. I knew of only one case where a white man in authority attempted to collect from the natives, and an imprisonment in Bilibid Presidio for six months had a wholesome effect.

The pay of native laborers in this department has only once been increased since I assumed charge. The native labor, which was formerly paid 40 cents gold per day for stevedoring, made a demand for 50 cents, which was the amount paid by the stevedores of the army transport service, and this advance was met. One hears a great deal about the high rate of pay of native labor in this branch of the quartermaster's department; reference to figures above will show this to be untrue. As labor became skilled it has been classified and the rate of pay fixed; but there has been no material advance in the pay for labor in this department since August, 1900. The men work for the same sum as they did then.

I became thoroughly convinced, on assuming charge of this department, that the Filipinos were entitled to the labor of these islands as far as it was possible to give it. I have made every effort—at times it seemed almost a sacrifice—to advance this cause. My efforts in this direction, however, have more than repaid me for the experiment, as I am not only able to get all the labor I want, but have seen the Filipino develop from what might be termed a shiftless laborer to a constant worker. As long as he was paid by the day, and his work was uncertain, it mattered little to him whether he laid off a day, or two, or even three, within a week. He is now paid by the month, and under no conditions is this rule broken.

The following facts which are taken from the time books and pay rolls of this department for the month of September show a result which surprised even me in the matter of constancy in their work.

Take the number of men employed regularly for the month of September, which were 643, and the working days at 26, the total number of days is 16,718 for the month, against time lost 583 days. This shows a percentage of time lost of $3\frac{1}{2}$ per cent, or an attendance of $96\frac{1}{2}$ per cent. The number of emergency or extra laborers is not included in this percentage.

When a ship is to be discharged I take on what is known as emergency or extra labor, work it for a week or two, as the case may be, and then drop it at the end of that time, but wherever the native is employed by the month and paid by the month, the books show that the percentage of absentees is not greater than among the American labor of this department. Without going into more complicated figures, I doubt very much if the American labor would not have a greater percentage of absentees in proportion.

Owing to the fact that the civil governor asked most particularly about the constancy of Filipino labor, these figures have been carefully made and are fully reliable.

As to the physical strength of the Filipino for lifting and doing other strong work, the remarks made above in the matter of their handling forage would illustrate their capacity for work of this character. What they lack in physical strength they seem to make up in knack or a physical trick which they exercise adroitly in handling heavy cargoes.

I fully realize that the conditions in the provinces are not so favorable as they are in Manila for the organization and development of labor, but I am of the opinion that while the progress may be slower there than here, still the same evolution and development will occur, and will become all the more rapid as the native becomes convinced of the sincere and earnest attitude of the Government toward his labor.

I have the honor to attach hereto extract copies of my reports made to the chief quartermaster of the division in the year 1901 and the year 1902, which, taken in conjunction with this report, will give a practical illustration as to the development and evolution which have been made by native labor in this department since August, 1900.

Very respectfully,

ARCHIBALD W. BUTT,
*Captain and Quartermaster, U. S. Army,
In Charge Land Transportation.*

His Excellency WILLIAM H. TAFT,
Civil Governor of the Philippines, Manila, P. I.
(Through office of the chief quartermaster of the Division.)

[Extract copy of annual report for the fiscal year ending June 30, 1902, forwarded to the chief quartermaster, Division of the Philippines, Manila, P. I.]

* * * * *

At one time emergency native labor was paid at the close of each day's business, and native labor employed regularly in corrals, storehouses, wood and coal yard, and on forage was paid semimonthly. Now they are all paid once a month, same as white labor.

Those persons discharged during the month are paid on same day discharged on an open roll.

In connection with the employment of native labor, I desire to state that two years ago it was almost impossible to employ any large number of men except through the padrones, who exacted from the men at least 20 per cent of their wages; in fact it was the custom at one time for the laborer to turn over his entire earnings to the padrone, who kept that proportion of the money he saw fit.

This office undertook to break up the custom so far as this department was concerned and succeeded. The padrones were kept away from the premises, and the men made to understand that they were hired direct, and were under no obligation to anyone, that the money they earned was all theirs and that no portion of it should be given the padrones.

In several instances it was discovered that the native foremen were taxing the men under them a certain percentage of their earnings. The foremen were promptly discharged and the reason therefor explained to the men.

In one case a white foreman was detected in this practice. He was discharged, arrested, prosecuted in the criminal court, and sentenced to a term of imprisonment for the offense. This had a most wholesome effect on all concerned.

[Extract copy of annual report for the fiscal year ending June 30, 1901, forwarded to the chief quartermaster Division of the Philippines, Manila, P. I.]

* * * * *

It is the policy of this office to utilize native labor wherever it is possible. The bulk of the labor in the paint shop is done by natives. They assist in the

repair shops, the veterinary hospitals, in the saddlers' shops, and in rigging aparejos. They also do the stevedore work in the shipping of forage, fuel, etc.

It may be of interest at this point to note that the native labor is capable of the most expert workmanship in many branches of the quartermaster's department. While they do not make good teamsters, solely by reason of the fact that they do not possess the necessary strength to handle the army mule and draft horse, yet as painters, carpenters, saddlers, trimmers, etc., they excel, and while the American occupation has raised the price of native labor, still it remains at a very low figure when compared with other labor in the islands.

* * * * *

I am convinced that under the direction of American foremen native labor is capable of attaining the greatest excellence in the branches above enumerated. Moreover, there appears to be no friction whatever between American and native labor, the two working side by side in perfect harmony and without any racial prejudices. The native seems anxious to learn the American methods, and in this department applies himself to carrying out the directions of the American foremen. The importance of this matter can not be exaggerated, for it seems to be opening up a solution of what would otherwise be a very difficult problem in the government of these islands. An earnest effort has been made in this office, wherever the races come together in great numbers, to bring about good feeling and fellowship between them. The natives have been taken into the shops, and the American foremen have evinced at times a patience and an earnestness in directing them in the skilled artisan's work which has surprised me, and which illustrates to a marked degree the liberal mindedness of the American workman.

* * * * *

In this connection it may be well to call attention to the excellent work of the Filipinos as carpenters when working with skilled American labor and under its supervision. For a time an effort was made to secure Filipino carpenters; but, this being impracticable, unskilled labor was employed, and very little instruction was needed to make it efficient with the saw, the plane, and the level.

* * * * *

One hears a great deal of the necessity of introducing Chinese labor into these islands to meet the demands. It has been my experience that any labor which can be performed by the Chinese can be performed equally well by the Filipinos. The latter, moreover, have marked advantages over the Chinese, inasmuch as they are more amenable to discipline, more imitative in their methods, more enthusiastic in their work for the work itself, and more easily assimilated by American workmen. While most of the coal is unloaded in this office by Chinese labor, employed by contractors, yet all the loading of coal from this office is done by Filipino workmen at \$0.40 gold per day. I have studied carefully the efficiency of these two classes in this particular work, and I unhesitatingly pronounce in favor of the Filipino. The Filipinos are certainly far superior to the Chinese in loading and unloading forage. Moreover, they show adaptability in handling the live stock and in workmanship in the repair and saddlers' shops, which I do not believe can even be equaled by the Chinese labor in these islands. I have dwelt at some length on the efficiency of Filipino labor, which as yet is in its infancy in expert work, for the reason that I have to handle a vast amount of it, and have studied it to an extent where I think my opinion may be of some value.

* * * * *

A true copy.

ARCHIBALD W. BUTT,
*Captain and Quartermaster, U. S. Army, in
Charge Land Transportation, Manila, P. I.*

I am satisfied that the labor of this department is now entirely freed from the padrones. The men appreciate the new order of things, and are apparently contented, and, notwithstanding the demand, at any time this office can readily secure all the labor required.

The Filipino is not dissimilar to the majority of mankind in that he is anxious to obtain regular employment, and when secured will do all in his power to retain it.

While the wages paid the natives are somewhat in excess of the wages paid in the past under the Spanish régime, still they are very low, but this enables the Filipino to provide something else than rice and dried fish for his family.

When once a native becomes accustomed to eat meat once or twice a week and to provide the same for his family, from that time he can be looked upon as a high-class and steady laborer, and works willingly and hard in order to insure his family from a return to the old conditions which confronted him and his.

The fact that the men are paid regularly, furnished steady employment, and are not paying anyone for the privilege of working, is having its effect on the laboring classes throughout the city in getting away from the clutches of padrones and others who have been robbing the laborer of his earnings.

* * * * *

A true copy.

ARCHIBALD W. BUTT,
*Captain and Quartermaster, U. S. Army, in
Charge Land Transportation, Manila, P. I.*

OFFICE SUPERINTENDENT LAND TRANSPORTATION,
Manila, P. I., October 23, 1902.

Capt. A. W. BUTT,
*Quartermaster, U. S. Army, in Charge Land Transportation,
Manila, P. I.*

SIR: Replying to yours of this date as to my experience in regard to the Filipinos as teamsters, mechanics, and laborers in this corral, also in answer to your question as how they compare with Chinese laborers, I have the honor of submitting the following report, based upon my personal observations in this corral and as superintendent transportation of the China relief expedition:

Filipinos as laborers.—I would respectfully state that they have proven highly satisfactory, and it is remarkable, out of the large number employed, how few are absent during the month. The percentage is less than 5 per cent.

As teamsters.—The experiment has been a great surprise to me. During the past twelve months train No. 5, consisting of 45 carts of different kinds, working one mule each, has been handled entirely by native teamsters, excepting the wagonmaster and the assistant wagonmaster, who are Americans. In care of these animals and harness no fault can be found. Each one seems to try to have a better-looking rig than the other. I doubt, however, whether they will be able to handle with safety more than one horse until they become accustomed to the large draft animals. They handle the escort wagon train in some departments in the city now, but owing to their timidity I have not, up to present time, utilized them on anything but the single American horse or mule. I have in his train more than twenty native teamsters that have been driving for the past twelve months, and during that time they have not been absent a day. This may in a measure be due to the strictness of the rules of this corral, yet, nevertheless, it shows where they are properly handled they make steady and faithful men.

Native mechanics.—We employ 50, mostly as trimmers and painters. Their work has been most satisfactory and daily attendance prompt.

Native laborers.—In the corral proper are employed a great number, who are used to police the yard and stables and taking care of extra stock. Fifty are used in the different storehouses to take care of the different articles stored therein, and in every instance their services have been faithful and satisfactory. The supply of each kind has at all times been more than equal to the demand.

Native laborers v. Chinese.—Since my arrival in the Philippines I have had no experience with Chinese labor, yet during the ten months I was in China with the China relief expedition I had to use Chinese labor exclusively in the same capacity as I now use Filipino help, and for this work I prefer the Filipino, as he is quicker to pick up a thing, and at the same time takes more interest, consequently more pains with his work.

Respectfully,

J. E. COLE,
Superintendent Land Transportation.

A true copy.

ARCHIBALD W. BUTT,
*Captain and Quartermaster, U. S. Army,
in Charge Land Transportation.*

MANILA, P. I., October 24, 1902.

A. W. BUTT,

*Captain and Quartermaster, U. S. Army,
In Charge Land Transportation, Manila, P. I.*

SIR: In reply to a question as to what I think of the efficiency of the Filipino laborers, I have the honor to report that I have ever found them as mechanics to be steady and industrious. The blacksmiths, wheelwrights, saddlers, painters, trimmers, and carpenters, in this department will average in skill with any class of mechanics, taking them as we pick them up. Their attendance averages 95 per cent.

I would recommend that more blacksmiths and wheelwrights be hired, as this is a good place to teach them the use of American tools.

Respectfully,

C. F. LANE,
Superintendent of Shops.

A true copy:

ARCHIBALD W. BUTT,
*Captain and Quartermaster, U. S. Army,
in Charge Land Transportation, Manila, P. I.*OFFICE LAND TRANSPORTATION,
Manila, P. I., July 25, 1901.The CHIEF QUARTERMASTER,
Division of the Philippines, Manila, P. I.

SIR: I have the honor to request authority to employ Filipinos as teamsters. I am convinced that by judicious handling the Filipino can be taught in a very short time to handle a team of mules or horses in an escort wagon. I tried the experiment, introducing them in the rigging shop, saddlers' shop, and paint shop; also as farriers, and lastly as packers. The paint shop is now run entirely by native labor, with the exception of one American foreman, and in every branch in which they have been trained with patience and earnestness they have shown an adaptability at the work which is surprising.

I have had the school for native packers running only for a short time. They take to the pack readily, and, after getting accustomed to the mule, do good service as mounted packers.

My idea is to take picked natives, place them on the escort wagons, teach them slowly the various parts of harness, how it can be mended if it should break while on the road, and drill them in the important but minor details of harnessing their teams. At first I would put them on the dump and sanitary carts, where they would have to handle only one horse or mule. Most of these animals which are used for this purpose are docile and well trained, and I would anticipate little trouble in substituting, by degrees, of course, native for American teamsters. I do not desire to make this change radical or all at once, but merely wish to prepare for a day when this office will be compelled, more or less, to rely on natives as teamsters.

I believe if granted this authority it would have a good effect on the natives themselves, as I have always found them ready to respond to any effort to advance them in the direction of well-organized labor. To this end I ask authority to pay native teamsters \$20 gold per month.

Respectfully,

ARCHIBALD W. BUTT,
*Captain and Quartermaster, U. S. Army,
in Charge Land Transportation.*

A true copy:

ARCHIBALD W. BUTT,
*Captain and Quartermaster, U. S. Army,
in Charge Land Transportation, Manila, P. I.*HEADQUARTERS DIVISION OF THE PHILIPPINES,
Manila, P. I., November 5, 1902.His Excellency the GOVERNOR,
Philippine Islands.

SIR: The opinions Captain Butt expresses respecting value and effectiveness of native labor are concurred in, but the payment of wages to natives such as now prevail, it seems to the undersigned, is all wrong: first, because it is not

necessary; second, because it fixes an unalterable standard which all others wish to profit by; and third, because it confuses and disturbs all labor values.

The policy of the army in Manila, it seems to me, in respect to wages paid is about as bad as bad can be, but no one person has now the power to correct it. The price of hemp, sugar, coffee, and copra is fixed in the great consuming centers of the world, and are subject only to such fluctuations as supply and demand cause. Americans set a pace respecting remuneration of labor that none without a national treasury behind can follow. The fact that labor now costs twice or thrice as much as formerly has not resulted in a corresponding increase or any increase in the value of hemp in London or of copra in Havre. It seems to me that the expansion of the cost of labor here has worked a great injury to the Filipino people and their commerce.

In the Quartermaster's Department of the Army, at various headquarters, there are now employed over 227 persons who receive over \$100 gold per month; at the same places there are an equal number who receive from \$100 down to \$40 per month, and it seems to me that almost all these persons should be natives and that the general policy of the military here should be to utilize the services of the Filipino wherever possible, but it is not easy to do this, as most of our officers are too much disposed to condemn the native and to insist that only American clerks, mechanics, etc., are able to do what is required of them.

Very respectfully,

GEO. W. DAVIS,
Major-General, U. S. Army, Commanding.

EXHIBIT F^d.

CITY ENGINEER OF MANILA—LABOR.

CITY OF MANILA, MUNICIPAL BOARD, SECRETARY'S OFFICE,
October 31, 1902.

SIR: Replying to the request of the honorable civil governor, of recent date, relative to the labor employed by the city, I am directed by the municipal board to herewith hand you the inclosed report thereon by the city engineer, which is concurred in by the board.

Very respectfully,

(Signed) BEET EDDY,
Acting Secretary.

THE ACTING EXECUTIVE SECRETARY,
Manila, P. I.

[Inclosure.]

CITY OF MANILA, DEPARTMENT OF ENGINEERING AND PUBLIC WORKS,
Manila, P. I., October 30, 1902.

SECRETARY MUNICIPAL BOARD,
Manila, P. I.

SIR: I have the honor to submit, in compliance with the request of the governor, the following replies to questions regarding the labor employed by this department:

1. Q. The number of laborers employed?—A. The city employs 1,714 laborers of all classes.

2. Q. Whether they are classified, and if so, into how many classes?

3. Q. What the nature of the work which each class does is?

2 and 3. A. The employees group, generally, under three heads—overseers, mechanics, and laborers. The laborers are usually divided into two or three classes, the more important work being given to the higher class.

4. Q. Whether they employ any skilled labor, and whether that is classified?—A. Mechanics and skilled laborers are not regularly classified, but are graded in pay according to their skill.

5. Q. What the wages are which are paid by them to each class of laborers?—A. Ordinary laborers are paid \$1, 80 cents, 70 cents, and 60 cents per day, local currency. A few assistants to janitors get 50 cents and 40 cents.

6. Q. When the wages are paid, whether at the end of each day, at the end of each week, or at the end of the month?—A. All wages are paid monthly.

7. Q. Whether they have difficulty in securing labor?—A. No difficulty is experienced in securing ordinary labor. It is not always easy to find skilled labor for temporary employment.

8. Q. How many hours a day the laborers work?—A. Eight hours constitute a day's work.

9. Q. Whether their labor is efficient or not?—A. Labor is fairly efficient and is improving. Labor in the city compares very favorably with that in the provinces. At present, considering wages and efficiency, work costs about 20 per cent to 25 per cent more than in the United States.

10. Q. Whether they employ any Chinese labor for the same work, and if so, how in efficiency the Filipino laborer compares with the Chinese?—A. No Chinese labor is employed by the city. Experience on contract work indicates that a Chino laborer will do about 20 per cent more than a Filipino. Their value is further augmented by the fact that they require less close superintendence.

11. Q. I should also like to ask particularly with reference to the constancy in attendance of the laborers; whether they lie off for a day or two after Sunday; what their physical strength is for lifting and other hard work; how the rates paid by the city compare with those paid by merchants for similar work?—A. The best grade of laborers and mechanics are as steady as could be wished. The class of men that spend Sundays at the cock pits around Manila are not to be relied upon after Sundays and fiesta days. This class, at least on the city rolls, is decreasing. The capacity of laborers for heavy work is quite up to the standard of their size. They are, however, not as willing to exert it as other races. Much can be gotten out of them under excitement or by stimulating them. As a rule the wages paid by the city are equal to those paid by private concerns. In some cases higher rates are paid to attract good men for a particular purpose. On an average our rates are probably somewhat higher for this reason.

Respectfully submitted.

(Signed) ROBERT MCGREGOR,
Captain of Engineers, U. S. A., City Engineer.

[From Report of the Philippine Commission, 1903, part 1, page 54.]

THE LABOR QUESTION.

American and foreign business men continue to complain of the difficulty in securing good labor. This question was discussed in my last annual report, and nothing has occurred since that time to change my views. I think it would be a great political mistake to admit the Chinamen freely into these islands as laborers. I am convinced that the Filipino, as conditions settle, can be made a good laborer; not so good as the American, not so good as the Chinaman, but one with whom it will be entirely possible to carry on great works of construction. We are now employing 2,500 Filipino laborers on the Benguet road, and our engineer reports that, wages considered, they are doing good work. We had an unfortunate experience in obtaining labor for this road, due to a misunderstanding with the proposed laborers, and to the fact that the men were obtained from an undesirable class in Manila and the neighboring provinces. It was fairly inferable from the facts that the persons who agreed to furnish the laborers, either intentionally or unintentionally, misled the laborers as to the terms upon which they should be employed.

* * * * *

The Atlantic, Gulf and Pacific Company, which is engaged in building the great Manila port works, needing in its employ from 500 to 1,000 men, has adopted the system of making the laborers comfortable and at home, and now can procure more labor than it needs, and good labor, too. The following letters from the vice-president of the company seem to leave no doubt upon this point:

MANILA, July 2, 1903.

SIR: Answering your esteemed verbal inquiry as to our success with the Filipino labor, we beg leave to state as follows:

First. We believe that Filipino labor can successfully be used. We are employing about 1,000 Filipinos, which is a practical demonstration that this statement is not a theory.

Second. To successfully employ Filipino labor is, to the American employer of labor, a new business, which has to be learned. If he can not learn it, he can not do business in the Philippine Islands.

Third. In general, the Filipinos have to be taught how to work. This requires a considerable proportion of intelligent high-grade American foremen and mechanics.

Fourth. The way to keep the Filipino laborer permanently in one's employ is to so arrange his surroundings that he is better off and more contented there than anywhere else. This we have attained by means of providing homes for the Filipinos and their families; also amusements, including Sunday fiestas, and schools where their children may be educated.

Fifth. We are opposed to the introduction of the Chinese. The only argument that we can see in its favor is that it may somewhat expedite the development of the resources of the islands. This temporary advantage is, we believe, over-balanced and overwhelmed by the ultimate injury to both the Americans and natives in the islands.

Sixth. We believe that the greatest need of the islands is the abolition of the Dingley tariff as far as it applies to the Philippines. We want the American market, not the Chinese laborer.

Very respectfully,

ATLANTIC, GULF AND PACIFIC COMPANY,
By H. KRUSI, Vice-President.

Hon. WM. H. TAFT,
Governor Philippine Archipelago, Manila, P. I.

MANILA, November 12, 1903.

SIR: Referring to your esteemed verbal request to state whether our subsequent experience with the labor situation here is in accord with our letter dated July 2, on this subject, would state that our experience since that time has confirmed us in our opinion therein advanced. We are having no difficulty whatsoever with our Filipino labor, who are doing the bulk of the work under our harbor contract.

The well-known civil engineer, Maj. C. F. Case, was recently at our quarry, and can advise you, if desired, as to the state of affairs there.

I wish to strengthen the statement made in my former letter with reference to the use of American foremen and mechanics. These men are the backbone of our organization, and a certain proportion of them are absolutely essential to the success of any enterprise requiring labor. They are required both to lead and instruct the Filipinos. They must be practical men and not afraid to work with their own hands. Our experience is that about 8 per cent of American foremen and mechanics is advisable.

We are firmly convinced that the best interests of the Philippines demand the use of Filipino and American labor, to the exclusion of the Chinese.

Very respectfully,

ATLANTIC, GULF AND PACIFIC COMPANY,
By H. KRUSI, Vice-President.

Hon. WM. H. TAFT,
Civil Governor Philippine Archipelago, Manila, P. I.

I also append the report of Captain Couden, of the United States Navy, upon the capacity of the Filipino for labor. He has charge of the large number of laborers employed at the Cavite navy-yard. It is marked Exhibit O.

The new electric street railway company of Manila, which is just beginning its work of construction, has had no difficulty in securing all the labor it desires.

The Commission employed Messrs. Norton and Drew as railroad engineers to make a reconnaissance survey for trunk lines through the island of Luzon. This report has been published, but will be hereto appended, for the sake of convenience, as Exhibit P. Mr. Norton is quite discouraging in regard to the possibility of securing native labor for the construction of railroads. I think that the facts do not justify his position in this respect. The Manila and Dagupan Railway was built with native labor, and the extensions which are now being constructed under franchises granted by the Commission are being built by the same labor. It is possible that were a very general system of railroad construction begun all at once in the islands, the supply of laborers here will be found deficient. In such contingency the emergency could be met by special legislation permitting use of cooly labor for a short period; but I anticipate no such necessity.

There is more importation of Japanese labor, but it has not as yet reached any proportion likely to have an effect upon the labor market.

THE EFFECT OF LABOR ON THE INVESTMENTS OF CAPITAL.

There is no doubt that the iteration and reiteration of the deficiency in the supply of labor in the Philippine Islands have had the effect of frightening American investors of capital from coming into the islands. The Commission

is strongly desirous of encouraging American capital to come here, but it should be noted that if American capital declines to come that English, Belgian, and other foreign capital is merely awaiting the franchises which are requested for railroad and other constructive enterprises, and that it will be the duty of the Commission to grant such franchises for the benefit of the islands. The owners of English capital already invested in the Manila and Dagupan Railway have accepted two franchises granted for the construction and operation of branches for that railway, and are very anxious to secure other franchises extending their railway in other directions. They are sufficiently familiar with the possibility of securing native labor and of making it available for reasonably economical construction of their works not to be frightened away from the accepting of such franchises and making such investments. A reluctance on the part of American investors will certainly lead to the acceptance of their propositions. It seems to me that this much ought to be said by way of warning American investors that when later on they shall come into the islands, and shall find foreign capital strongly entrenched in many profitable enterprises, they will have only themselves to blame for a failure to seize the opportunity when it was offered them.

The disposition to harken to pessimistic maligners of conditions in the Philippines may prove to be, in this sense, quite costly.

EXHIBIT O.

REPORT OF CAPT. A. R. COUDEN, COMMANDANT, U. S. NAVAL STATION, CAVITE, ON FILIPINO LABOR EMPLOYED AT THE NAVY-YARD.

UNITED STATES ASIATIC FLEET,
PHILIPPINE SQUADRON, FLAGSHIP RAINBOW,
Cavite, P. I., November 13, 1903.

SIR: I inclose herewith a copy of a communication from the civil governor of the Philippines, with the request that you submit the report therein mentioned for transmission at your earliest convenience.

Respectfully,

YATES STIRLING,
Rear-Admiral, U. S. Navy,

Commander of the Philippine Squadron, United States Asiatic Fleet.

The COMMANDANT,

U. S. Naval Station, Cavite, P. I.

OFFICE OF THE CIVIL GOVERNOR OF THE PHILIPPINE ISLANDS,
Manila, November 12, 1903.

ADMIRAL: I am informed that Captain Couden, U. S. Navy, as the commandant of the navy-yard at Cavite, has had a large experience in dealing with Filipino labor, and as in my annual report I feel obliged to make some reference to the subject it would give me great pleasure if I could have the views of Captain Couden in this matter. I have spoken to him informally in regard to it, but I take this more formal method of securing the report.

With the hope that my request may be granted, believe me,

Sincerely, yours,

WM. H. TAFT,
Civil Governor.

Rear-Admiral YATES STIRLING, U. S. Navy,
Commanding Philippine Squadron, Cavite, P. I.

U. S. NAVAL STATION, *Cavite, P. I., December 12, 1903.*

SIR: Referring to your letter of November 13, 1903, transmitting a letter from the Hon. W. H. Taft, civil governor of the Philippine Islands.

2. There are large numbers of Filipinos employed at this station in all capacities, from common laborers, writers, copyists, minor clerks, to mechanics, including boat builders, machinists, boiler makers, leather workers, sailmakers, flag makers, ship fitters, riveters, blacksmiths, and all the various trades and callings of a naval repair yard.

3. As to common labor, when a gang of men is employed on one sort of labor continuously they become after a time very satisfactory; for instance, we have

a gang handling coal, and no better men for the work could be asked. It is possible to observe this labor and to readily determine its character, and the cheerfulness and activity displayed is surprising and commendable. These men are employed by the day and not by the ton handled.

4. Common labor, where it is of a changing character—for instance, piling lumber one day, loading cascos another, digging trenches, cleaning up a piece of ground—seems unsatisfactory; they are not quick to work in unison and with efficiency. Desultory work, such as keeping the roads and walks cleared of all rubbish, leaves, etc., is always open to view, and as in all parts of the world such labor is lazily and inefficiently performed by the least capable and least ambitious. On the whole, I believe the common labor here at Cavite is fair and that it is improving from month to month.

5. *Clerks, writers, and copyists.*—There is a tendency more marked here than in the United States to seek employment in these grades, but the tendency has very noticeably diminished within the last year, as it has been vigorously discouraged. They make excellent copyists and typewriters, neat and rapid, but are much handicapped as to usefulness by their lack of English and the consequent necessity of making an original smooth copy. The younger boys are rapidly picking up English, and this will much increase their value in these occupations.

6. We build here many ship's boats and do it at a constantly decreasing cost; in this department we have an excellent American foreman, who has now a competent and faithful set of employees. They are very industrious; an idle man is never seen; they do good work and exhibit a desire to do the best possible.

7. Boiler makers are doing good work, and they show a marked improvement in the last year; ship fitters and riveters are good and improving.

8. The older sailmakers who learned their trade under other systems are faithful workers, but can not work from a plan or sketch on a reduced scale, while the younger men who are now learning the trade exhibit great interest and quickness in picking up our methods, and will, our chief sailmaker believes, make most excellent workmen, capable of planning and executing work as foremen. The flag makers, all Filipinos, make the neatest and handsomest work I have ever seen and are entirely satisfactory. This work has all been learned at this yard.

9. Machinists are employed in large numbers and have improved very noticeably; some of the younger men who have received all their training here are very quick to learn and are found the most satisfactory when new machines from the United States are introduced. Men who are really little more than boys are running such machines very satisfactorily.

10. *Apprentices.*—Within the last six months we have commenced entering apprentices in the various trades. The number of these was fixed by the Navy Department in accordance with the practice at home. The system promises such excellent results that a large increase in the number allowed has been asked for and will probably be granted. A very few years under this method will make this a school for the education of mechanics, not only for our own needs but for the general good of the islands. There will grow such a demand for efficient handicraftsmen in the mechanical arts in the various ports of these islands that a succession of apprentices, becoming journeymen, will commence their journeyings and spread the gospel of steady industry and its rewards.

11. *Molders.*—Molding is the only trade in which we have no Filipino men employed. It appears that no foundry was ever established here (Cavite) in which Filipinos were employed; all of our molders are Chinamen, receiving abnormal wages. We have, however, commenced the apprentice system in this branch and hope to make progress in their training, though the circumstances are very adverse.

12. *Leather workers.*—The making of magazine buckets and similar articles of heavy leather for use in connection with the handling of ammunition is successfully carried on, the men receiving their instructions here recently.

13. There is a marked improvement in the carpenter's gangs observable within the last year.

14. While comparisons between Filipino labor and that of Chinamen and others is futile because of the many variable quantities that have different values according to one's point of view, there is no doubt in my own mind that Filipino labor will prove more satisfactory at this station than any foreign labor, and that in the trades it will be satisfactory; that its employment will be of great value to all the people of the province, and indirectly to other parts of the islands, in educating them to see the advantages of stability and quiet

and the opportunities for permanent betterment of their own and their children's lives. An improvement in the physical condition of the workmen, and more especially of the younger generation, is visible within the last year, due to the gradual improvement in food because of the greater capacity to purchase, and greater demands of the system because of greater industry.

15. Inclosed herewith are recent reports from the various heads of departments of the station on this subject.

Very respectfully,

A. R. COUDEN,

Captain, U. S. Navy, Commandant.

The COMMANDER IN CHIEF,
U. S. Asiatic Fleet.

U. S. NAVAL STATION,
Cavite, P. I., December 7, 1903.

SIR: Referring to the commandant's No. 2483, dated November 16, 1903, for a report in detail of the progress made by Filipino labor, skilled and unskilled, during the past year, I have the honor to submit the following:

SKILLED LABOR.

(a) *Machinists.*—Machinists have progressed to a very considerable extent in the ordinary routine work of their trade; they are, however, noticeably handicapped by their inability to read a drawing or blueprint, and in this respect they do not seem to make any marked improvement.

(b) *Electrical machinists.*—Electrical machinists have progressed very little in their line of work. They are able to run wires and make ordinary connections, and have also learned to make repairs on small motors and to rewind armatures; but if the connection is in any way intricate, as in a cross-connected armature, they do not seem to be able to grasp the method. However, there is very little of this class of work, and no great advancement in proficiency could be looked for. One of the worst faults they have is that if on completion of a job the work shows there is an error somewhere, they are totally unable to retrace their work and find wherein is the fault.

(c) *Carpenters.*—Carpenters have shown the greatest improvement in the class of work that is done in this department, which, however, is not of a high order. They have done some very clever work in the way of desks, file cases, etc., but the bulk of their work has consisted in the making of chart boards, tool handles, and rigging appliances, which they have done well and satisfactorily.

(d) *Riggers.*—There is very little fault to find with the manner in which the employees of this subdepartment carry out their work. Most of them are old and experienced hands; and as there is very little, if any, technical knowledge required in their line, they are apparently steadily improving.

(e) *Sailmakers.*—The quality of work that is being turned out by the sailmakers is, on the whole, very good; but as the ability to read a print or follow a plan is essentially a quality of an expert sailmaker, and one which none of these men possesses, constant supervision on the part of the foreman is imperative. The chief sailmaker tells me he accounts for this by the fact that most of his men are old hands and learned their trade under the Spanish rule, a method much more crude than the one in present use.

(f) *Flag makers.*—These women have learned to work from a sketch or plan and have attained such a degree of proficiency that very little, if any, supervision on the part of the foreman is necessary. Neatness and dispatch characterize their work, and its quality is good. Their progress has been really marked.

(g) *Clerks.*—The clerks are as a rule improving. With hardly an exception every man is proficient in the individual task assigned him, one in particular having acquired remarkable speed on the typewriter. All of them are, however, at a great disadvantage in not being able to construe English to any extent, and but one or two appear to go to any pains to overcome this.

UNSKILLED LABOR.

This class adapt themselves very readily as a rule to the work given them, and are, the younger men particularly, apparently anxious to learn. In this respect it is thought worthy of mention what the chief sailmaker tells me of

the apprentices in his department. They are naturally apt; and as they have nothing to unlearn (as have most of the older hands), what they are once taught they readily grasp, and he is, he says, sanguine of their developing in time into really first-class workmen.

In summarizing the progress made by all subdepartments, both skilled and unskilled, it would appear that the underlying principle which will tend to ultimately retard Filipino labor from becoming really A1 workmen is their low degree of intelligence and consequent lack of a knowledge of the fundamental theories of their respective trades, until they acquire which there is always the possibility that, if left to their own devices, some new phase of their work will present itself and which they will be unable to solve unaided.

Very respectfully,

J. F. PARKER,
Commander, U. S. Navy, Equipment Officer.

THE COMMANDANT,
U. S. Naval Station, Cavite, P. I.

U. S. NAVAL STATION,
Cavite, P. I., December 3, 1903.

SIR: Referring to the commandant's letter dated November 16, 1903, which requests a full and complete report on the progress of Filipino labor during the last year, I have the honor to report as follows:

2. As the efficiency of the Filipino mechanic is so closely interwoven with the efficiency of the department of which I have charge, I dwell somewhat on the subject in question in my annual report dated July 6, 1903.

3. Being head of the department, my recommendations were based necessarily on grounds to promote the efficiency of the department, the simultaneous improvement of the Filipino being alluded to more as incidental.

4. I quote below verbatim from my annual report and will comment later in this communication, giving my views at the present time, and showing where I have modified my views, if I have done so.

5. *Administration of department.*—"1. The principal difficulty in the administration of this department is the want of the proper supervision in the individual shops. This is a loss to the Government financially. In addition to the business side, there seems another phase worthy of consideration in connection with this.

"2. The Government has been spending stupendous sums of money for the education of the Filipino, and is continually striving to improve his condition. That the average Filipino likes to work is a much-mooted question. The experience here has established that where there is intelligence and some little school learning the native at once shrinks from mechanical trades, each desiring to be an 'escribiente' (writer).

"3. Recently the advisability of enlisting Filipinos in the service has been considered. For this reason, as well as the other above outlined, there would seem no better method to improve the condition of the Filipino and further the interests of the service, the Government, and country at the same time than by a development of the natives as far as possible in mechanical trades at this navy-yard. Under the present system in this department the Government suffers, and there is no chance of developing any new material. I allude to the fact that there has been only one white American mechanic in the shops where 488 men are employed.

"4. His supervision was of necessity most general, and the Government was continually losing money because of this condition. This one white foreman has been so occupied with his general superintendence and necessary office work that the development of any individuals because of contact with him is out of the question."

6. *Skilled labor.*—"1. For the Government's present interests financially and for the Government's future interests financially and otherwise, I recommend strongly that each shop of this department have at its head a good American mechanic. He would at once more than save his salary to the Government.

"2. I believe that the consequent possible development and education of the Filipinos in the mechanic trades should have fully as much weight as the immediate financial advantage to the Government. If the education of these people is determined upon, should it be restricted to school learning, which in many

cases, where there is not enough strength of character, produces men who do not care to do manual labor? The discipline to which they are subject in a navy-yard is also, I think, not a small factor in their education.

"3. I am primarily speaking for the efficiency of the shops of which I have charge, and secondarily for the development of the natives into good, conscientious workmen, making good subjects.

"4. Outside of the immediate interests of this department, and in a general way the interest of these islands, which must have labor if the islands are to be developed, and some skilled labor at that, the immediate interests of the service demand just such a school as properly organized shops at the navy-yard would give for the education of these people in mechanical trades, if they are ever intended to enter the service.

"5. The dearth of skilled labor is bound to be felt more and more, and the Government, especially with its fixed rules for wages, is bound to feel the effects of it. With the development of the islands, skilled labor will be in demand, and this department has already lost some of its best men because outside civil establishments paid these men better wages than are authorized at this navy-yard. In stating this I do not desire to give the impression that navy-yard help is not so well paid as in outside firms, but rather that an outside firm, when an able man is much desired, will obtain him at any cost, being not tied down by a fixed schedule of pay. We should, therefore, aim to develop as many able men as possible so as not to feel the loss of a few.

"6. The question of skilled labor is especially worthy of consideration; yes, even urgent, because of the exclusion of Chinese. Some of the most able workmen in this yard have been Chinamen, but, as is evident from the law, there can be no further supply when these are exhausted.

"7. That white labor should be used here in any capacity other than that of supervision is out of the question. Something should be done, therefore, to effect the development of the Filipino skilled laborer. As stated above, I consider the appointment of a good American mechanic for each shop the best method. The need of skilled labor is especially felt in the machine shops because of the continual demand for this class of work.

"8. If their development is expected to be evolved out of themselves, I do not think the goal will ever be reached.

"9. When American help is employed, it should be borne in mind that the climate is a severe test, especially when a display of energy is expected, and on that account only young men should be appointed for this duty."

7. *Working hours.*—"1. Whether it is to the advantage of the work and efficiency of the department that there should be two schedules of time, one for Americans and the other for Filipinos, is questionable; in my mind it is not. If the natives are to be taught American methods, and especially are to be taught to work with the energy approaching that characteristic of the average American workman, the hours for the natives are too long.

"2. As the hours are fixed for the Americans they are considered amply long, especially in consideration of the climate. The idea that the natives are not subject to the climatic influences is, I think, a mistake, because from my observation I conclude that they do decidedly feel the effects of this extreme heat, and a large proportion are in poor health, the average Filipino being in physical strength and endurance far below the average American.

"3. If the hours for the natives were the same as those for American help, with the proper number of American employees, they would continually be under supervision, and would be receiving a thorough training, and would finally be deprived of the grievance arising from this discrimination in time schedule against them.

"4. If there has not been any protest it will surely come, and I consider it to the advantage of the department that this discrimination should be eradicated before an open protest is made."

8. *Attendance of employees.*—"1. The question of irregular attendance is one that has received much attention, but no satisfactory remedy has been found.

"2. There are three general causes for the large percentage of absences:

"First. The disposition of the average native to take things easy.

"Second. The great amount of sickness among them.

"Third. The frequent occurrence of holidays other than our national, which they will observe notwithstanding the urgency of any work on hand. These are the conditions which, if it is possible to change any of them, can be changed only most gradually."

9. Generally speaking, I can state that I have not changed my views from those expressed in my report as quoted above, excepting, perhaps, that with the longer experience I have had, I am willing to modify them in the direction of putting a greater value on the possible development of the Filipino.

10. We are a people of an entirely different race, which makes it possible that in many cases of unfavorable judgment of them we may be as much at fault as they, as each views conditions from an entirely different standpoint, and a position which one believes as correct as the other.

11. These people, too, had been in subjugation for many years, while we have enjoyed all the advantages which freedom and generations of training and development have given us.

12. This department has already had an illustration of what advantage will accrue to the Government, as well as the Filipino, if the Government will only make an effort to instruct the best qualified of those anxious to learn.

13. I have reference to the fact that recently I have had two Americans in the shops of this department instead of only one. Although this has been a most meager increase, nevertheless, I see a decided improvement in the boys anxious to learn, because of the little individual attention they have had recently and which it was not at all possible to give them formerly.

14. With the older men it is difficult to introduce new methods, but that is a condition which I think holds true for all races and conditions of life, it always being a difficult matter to "teach an old dog new tricks."

15. Considering the primitiveness of the former methods under which these people have worked, and the not much more than primitive means which have been placed in the hands of this department, some of them have shown marked ability.

16. There are two conditions insurmountable for sometime to come which will subject these people to unfavorable criticism.

The first is that our languages differ, and this makes the transmission of ideas and instruction and the understanding of same difficult and at times impossible.

The second is that, be it because of their frugality in living and character of their food, or of the climate, or all of these, they are not equal physically to ourselves.

17. There are few of us whose mental and physical alertness and endurance^e are as great at the end of a tour of duty here as they were at the beginning of the duty. This is especially so when we have been held to continuous work without any relaxation.

18. With all these conditions against them we exact more of them in some ways than we do of ourselves, for we require of them more working hours each day than are required of any American employee.

19. Much has been said about their mendacity and general unreliability. Such characteristics are generally the result of bringing up, association, and conditions under which they have been living. If some of them have not a high regard for truth or for other people's property, such infractions are likely to occur anywhere when such a large body of men is employed as here.

20. In view of such existence as these people have had for many generations past, it seems only natural that they should not have the characteristics which we expect to find in a people who during the same period of time have had all the advantages which come with independence and close association with all that is most progressive.

21. In view of what was said in my annual report as to the general disposition to secure employment as "escribientes," I now desire to modify this to this extent.

22. There have been applications by boys, who have had good schooling and spoke some English, for appointments as apprentices. These could, however, not be made, as there were no vacancies, the number allowed being very limited.

23. When speaking in the report of the dearth of skilled labor, the demand outside for such labor was anticipated. This has been borne out by actual experience.

24. This department has only been able to retain such of the best Filipino mechanics as have ties here, these preferring to hold their position here in preference to one in Manila with better pay.

25. The ordinary laborers have had little chance in the past for development, as it has been impossible on account of the few Americans available for supervision to give them much attention.

The greatest difficulty with them is that few of them speak even Spanish, which makes them difficult to handle.

26. Where in my report I speak of the reasons for many absences from work, I give as one reason: "The disposition of the average native to take things easy."

27. At that time I was not familiar with the fact that so many employees live at great distances in outlying towns, and are frequently absent on account of rains and bad roads, which, in a measure, may ameliorate this shortcoming.

28. If the progress desired in the development of the Filipino has fallen short of expectations, the experience in this department inclines me to ascribe it primarily to the lack of proper material in the way of tools and plant necessary to inaugurate modern methods, as well as to the altogether inadequate number of skilled Americans capable of teaching the natives new methods.

29. The proper American equipment, both in material and personnel, has been so wanting that it at once bars criticism of the Filipinos for not having made greater progress.

Very respectfully,

GUSTAVE KAEMMERLING,

Lieut. Commander, U. S. Navy, Head of Department Steam Engineering.

The COMMANDANT.

U. S. NAVAL STATION,

Cavite, P. I., November 18, 1903.

SIR: In answer to your letter dated November 16, 1903:

1. I have the honor to make the following report on the progress of Filipino labor during the year:

2. The skilled labor of this department is better than it was a year previous, and we are now doing better work than was done a year ago.

3. We have manufactured sights for several vessels for a reasonable price, and which have proved satisfactory in every detail. Also spare parts and accessories for rapid-fire and automatic guns. We have also manufactured revolver holsters and revolver cartridge boxes, canteens, and leather ammunition-passing boxes for the U. S. S. *Kentucky*. This kind of work was never done in this department until this year, and it turned out very satisfactory.

4. Attention is called to the differences in prices of great-gun targets (prize firing) that were made last year and those that were made this year. The cost of labor for making four great-gun targets (prize firing) last year amounted to \$753.70 gold. This year we made eight similar targets—cost of labor, \$346.89 gold. This does not include price of material. The reasons for the great difference of prices are: That we installed a bolt-threading machine and sewing machine, the latter for making the screens. Also the men were more familiar with their work and went about it more intelligently.

5. A model of 4-inch rapid-fire gun, one-fifth scale, was made in this department and sent to the St. Louis Exposition. The workmanship was very neat.

6. The carpenters are much better than they were a year ago, doing their work quicker and go about it more workmanlike.

7. The skilled laborers at the magazine are mostly men who have been promoted from common laborers, for being careful and intelligent in the performance of their duties. They have been engaged in such work as putting up 6-inch and 4.7-inch ammunition and breaking down, blending, and putting up minor caliber ammunition and handling and overhauling ammunition of all calibers, repairing and painting ammunition boxes and chests and re-forming cartridge cases.

8. The unskilled laborers in this department are good workmen and are improving; they are engaged in general magazine work, making shipments, loading and unloading cascos and lighters, and care and preservation of ordnance.

9. In my opinion the Filipino labor is much more satisfactory than it was a year ago and is improving.

Very respectfully,

J. T. SWIFT,

Gunner, U. S. Navy, Acting Inspector of Ordnance.

The COMMANDANT.

U. S. NAVAL STATION,
Cavite, P. I., November 28, 1903.

SIR: 1. In compliance with instructions contained in your letter dated November 16, 1903, directing report on the progress made by Filipino mechanics and laborers during the past year, I have to report as follows:

2. It must be stated that, as a rule, the Filipino workman is indolent and indifferent to his own advancement beyond a very limited degree. This must largely be accounted for by the environment of the Filipino race for many generations past; the enervating effect of the climate, together with the few wants of the native, and the ease with which the necessities of life are obtained, cause him, as a rule, to be easily contented and careless as to improvement.

3. In the case of the older men little progress can be detected even where there has been constant supervision of American foremen, the older men reverting to their former methods when immediate supervision is removed.

4. The case of the younger men is somewhat more encouraging and a fair amount of improvement is to be noted, as they are quicker to see the advantages of improved methods of work, and it is believed that they are also more anxious for their own improvement.

5. I am strongly of the opinion that, if the Filipino is to be depended on for skilled labor in Government work at this yard, it will be necessary to maintain a well-organized force of competent American foremen for many years to come. The younger men will slowly but surely improve as they come in contact with improved methods and are compelled to use them daily. In this connection it is believed that the apprentice system, if largely extended so as to take in a much greater percentage of apprentices than now employed, will result in marked improvement in the force of mechanics.

6. The same remarks apply to unskilled as to skilled labor, as many of the younger men employed as helpers gradually learn the trades and make fairly good mechanics.

Very respectfully,

W. P. ROBERT,
Assistant Naval Constructor, U. S. Navy, Head of Department.

The COMMANDANT.

[From Report of the Philippine Commission, 1904, part 2, p. 42.]

MINING LABOR.

Although some of the natives of Lepanto and Benguet are accustomed to work in mines and like to do so, no large force of native miners has as yet been developed. The success obtained in using Filipino labor at the Mari-veles quarries, on the Benguet road, and by the street railway company in Manila encourages the belief that there will be no great difficulty in securing a sufficient force of satisfactory miners as the mining industry develops. A Spanish mining superintendent is authority for the statement that he can at any time secure 60 good Visayan miners in the city of Cebu and begin the development of any coal mine in the island, and that with these men to instruct inexperienced laborers, he can in time develop a large force of coal miners. This man states that in mine timbering and other precautions for safety the Visayans have proved to be as good miners as could be desired. There is no reason for believing that the people of this tribe are likely to be better than the Ilocanos, Tagalogs, Bicolos, or other civilized peoples of the islands. The collector of customs has rendered a decision to the effect that a miner is a skilled laborer, so that Japanese miners, and in fact any miners other than Chinese, may be imported under contract.

Unsettled conditions, due to brigandage and insurrection, are no longer such as to delay the development of mines in any province.

[From Census of the Philippine Islands, 1903, part 4, 427.]

IX. LABOR AND WAGES—CAUSES OF SCARCITY OF LABORERS—THE FILIPINO AS A LABORER—WAGE TABLES.

The difficulty of securing adequate and efficient labor for systematic industrial enterprises on a large scale has been frequently commented on by writers and others in discussing conditions in the Philippines. The scarcity of labor

has always been assumed as a fact, admitting of no serious contradiction, and has generally been charged to the natural aversion of the average Filipino to all kinds of regular or sustained effort as a laborer, predisposed and accentuated by the climate and the richness and productiveness of the soil, by which his simple wants are easily supplied.

These causes have no doubt existed to some extent, and still exist; but other causes have also operated to prevent the development of industrious habits among the natives. The repression to which they were subjected by the Spaniards for more than three centuries; the commercial restrictions which prevented any extended development of industry beyond that specially fostered by the Government; the enforced labor with little or no compensation, amounting in many cases practically to slavery, which the natives were required to perform and which doubtless gave rise to or greatly strengthened the belief that manual labor was degrading; and the apparent impossibility of bettering economic conditions were no doubt baneful influences, calculated to create indifference, if not distaste, on the part of the Filipino for manual labor of any kind. But they have shown that they can overcome this indifference and have demonstrated, under intelligent supervision, in Manila at least, that they have natural aptitude and efficiency as workmen, not only in governmental employments, both civil and military, but in various branches of commercial and manufacturing industries carried on in that city. A large number of natives have been and are employed by the army and navy, and as a rule they do their work competently, regularly, and with little or no friction. And what has been accomplished there in the way of utilizing native labor can undoubtedly be accomplished throughout the islands generally if the same methods are applied.

A report made to Governor Taft, November 4, 1902, by J. B. Aleshire, major and quartermaster, United States Army, in charge of army transport service at Manila, clearly demonstrates the availability of native labor and strongly refutes the frequently expressed idea that such labor can not be profitably employed. His report shows that upward of 1,800 Filipino laborers, skilled and unskilled, were on the pay rolls of the Quartermaster's Department, a large proportion of whom were given regular and almost continuous employment. About 450 of the employees were engaged as launch and lighter officers and crews and were rated as unskilled, having been principally engaged in the handling of coal, freight, baggage, forage, etc.

The wages paid were as follows: Skilled laborers were classified and their rates of pay fixed according to the size of the launch to which they were assigned; the monthly wages in United States currency of patrones (masters) were from \$20 to \$50; engineers, \$32.50 to \$50; assistant engineers, \$20 to \$40; oilers, \$15 to \$20; foremen, \$15 to \$20; sailors, \$10.

Unskilled laborers were classified as deck, river, and bay stevedores and bosses; laborers were paid 50 cents per day and the bosses \$30 per month. During the year ending June 30, 1902, the number employed daily averaged 57 bosses and 906 stevedores.

Their hours of labor were from 7 a. m. to 12 m., and from 1.30 p. m. to 5.30 p. m., and under emergencies, whenever required, with no extra pay for Sunday or night work; under these conditions there was no difficulty in securing efficient labor. All Filipino employees were paid at the end of each month for the number of days' work performed during the month.

In concluding his report Major Aleshire says:

"Chinese labor was formerly employed for the handling of coal, but has been abandoned and replaced by Filipino labor, which, by practical tests during several months, averaged more tons per day per man and at a much lower rate per ton.

"The attendance of the Filipino laborer has been and is excellent. They do not absent themselves after Sundays, holidays, or fiestas, nor during such days should they be notified in advance they will be required to work. Their physical strength is much improved, and they are capable of doing as much and as hard work as any laborer we have in the Orient."

Testimony similar to the above is given in a report dated October 24, 1902, to the civil governor of the islands, by A. W. Butt, captain and quartermaster, United States Army, in charge of land transportation at Manila. The report states that during the month of September, 1902, an average month in the mat-

ter of labor, 941 Filipinos were employed in the land transportation department, classified and paid, in United States currency, as follows:

	Per month.
Farriers	\$30.00
Teamsters	20.00
Packers	18.00
Saddlers	17.00
Trimmers	14.00
Painters	14.00
Carpenters	14.00
	Per day.
Stevedores	0.50
Ordinary laborers	0.40

The employees received their wages monthly for the days actually worked. They were faithful, efficient workmen, careful and trustworthy, and, in occupations requiring the exercise of judgment and skill, rapidly developed superior ability. After proper training they performed as much and as good work as any other class of employees.

The Filipino labor employed in the ordnance department has not apparently proved as satisfactory as in the other two branches of service above referred to, concerning which reports have been made. J. H. Rice, Lieutenant, Ordnance Department, U. S. Army, in charge of the Manila ordnance depot, in a report submitted to the civil governor on November 12, 1902, states that 191 workmen were employed at the department, classified and paid according to ability, in United States currency, as follows:

	Per day.
11 saddlers	\$0.48 to \$0.80
28 carpenters .....	.48 to 1.25
2 painters .....	.64 to .80
2 engineers .....	.50 to .80
27 armorers .....	.50 to 1.00
7 machinists .....	.50 to 1.00
4 blacksmiths .....	.50 to 1.00
4 tanners .....	.64 to .88
2 molders .....	.50 to 1.00
1 storehouse assistant .....	.80
6 storehouse assistants .....	.50
1 foreman of laborers .....	.80
95 laborers .....	.40
1 janitor .....	.48

The wages paid were monthly, eight hours constituted a day's work, and no difficulty was experienced in securing unskilled labor, but the report states:

"We have had much difficulty in securing skilled labor that we can use to advantage. In so far as possible, we endeavor to make skilled mechanics by teaching the unskilled, but the number with whom the effort is a success is small, as many seem either unable to advance beyond a low grade of work or do not care to make sufficient effort to obtain the increased pay.

"The efficiency of their labor is a matter of the standard chosen. As compared with the labor employed at arsenals in the United States it is not efficient. The cost of production is approximately the same, if anything a little higher here, and the greater part of our material is included at the cost price in the United States. The quality of the work is not so good, and there are considerable losses due to work that must be rejected. The men are not systematic, rapid, or trustworthy as laborers, and it seems nearly impossible to teach them these qualities. * * *

"There are not more than half a dozen natives employed who can be trusted to do alone and properly a piece of work with which they are familiar, and not one to whom it is safe to intrust anything having features new to him, however carefully he may be instructed. This does not mean that his work is always wrong, only that it is impossible to be sure that it will be right. Doubtless as a result of long training the necessity for really good work does not

seem to be comprehensible to the majority of Filipinos at this depot, and if they make a mistake they seem to think it fully rectified by a patch, although several men have been discharged on this account. The time required to get anything done is a distinct disadvantage and can not be fully covered by an increased number of workmen, since the number that can be employed on any one job is limited."

It should be observed that labor of a much higher degree of skill and efficiency is required in the work of the ordnance department, Manila, than in either of the other branches of the service above referred to.

On this subject Maj. Gen. Arthur MacArthur, military governor of the Philippines, said in his annual report of 1900:

"Reiterated assertions to the effect that a native laborer in the Philippines is unreliable must be accepted as coming almost exclusively from Europeans who primarily are exploiters pure and simple, and as such have absolutely no interest in the islands beyond the immediate realization of enormous profits. Under the old system the wages of labor were too small to establish anything like a sense of self-interest on the part of employees, and as a consequence solicitude for the interests of employers did not exist, and workmen as a rule were indifferent as to their own constant employment and had little concern about the future, as their own wishes or interests were never consulted. American experience, so far as public employees are concerned, has not confirmed the declaration of the Europeans. On the contrary, it has been found that, when properly paid, the Filipino is precisely like any other man and holds on to a good place by reason of fidelity and faithful service."

Mr. H. L. Higgins, general manager and constructor of the Manila and Dagupan Railway, who had resided in Manila since 1887, stated to the Schurman committee, 1899, in regard to the labor used in building the railway:

"We tried the Chinese on one section, and they did not do good work. They would not work in water. The Indian will work in water better than a Chinaman. On a day wage the Indian will do as much work as a Chinaman in the same time. On piecework the Chinaman works like a slave, but put him on day work and he won't do anything. I like the native. I think he is a very good man in that position (referring to porters), but if you give them any administrative power they won't do. You can't put native inspectors on, and you can't have big gangs of natives under natives. You must have all your station men under an English inspector. You must have all of your drivers under an English foreman, and your shop must be under an English foreman. If you put them under a native foreman they go to pieces. They take advantage of it, and it generally ends up by swindling if they have any power. That is the great fault in the character of the native—they abuse their power."

Mr. Harold Ashton, of the firm of Holiday, Wise & Co., who had resided in the Philippines at that date for twenty-one years, stated, in speaking of their qualifications as laborers and mechanics, that they preferred light work, except lighterage. "That is very heavy work; so heavy that even the Chinese do not like it. * * * We have a gang of Filipinos which works in our godowns, and if it is a big job we have two gangs, when it is very stiff work, and we find that the Filipino gang does better than the Chinese coolies." In regard to their abilities as mechanics he said, "They made the only railroad that is here. The head of the railroad recently said to me, 'It is very surprising how they take to bridge making and the rest of it.'"

In an address delivered before the Union Reading College, at Manila, December 17, 1903, Governor Taft, in referring to the labor question, spoke as follows:

"With respect to the possibility of obtaining satisfactory labor from the Filipinos, I have only to say this, that experiments have shown that those who have gone about the matter systematically and have attempted to find out what the native needs to keep him constant in his attendance upon work have been successful, so that, wages considered, his work has been fairly satisfactory. But it is very certain that before satisfactory labor can be obtained from him he must be under the control of a master who understands him. I know the disposition of most Americans here is to open the doors and let in the Chinese, so that we may have Chinese cheap labor in the islands, but I am emphatically opposed to the general policy of admitting the Chinese; first, because the Filipinos have the strongest opinion that it will be for their detriment; and second, because I believe the history of the Straits Settlements shows that it will not be

for their prosperity as distinguished from the material prosperity of the islands. I am opposed to admitting any Chinese labor until it shall be made to appear that the great works of construction which are essential in the islands can not be carried on satisfactorily with Filipino labor. This has not yet been shown, the young lions of the Manila press to the contrary notwithstanding. Of course we are all much affected by that which comes nearest to us, and when a newspaper proprietor or editor suffers from negligence, indifference, or ungrateful treatment by his compositors and pressmen, upon whom he is depending for getting out the paper, it is natural that he should feel indignant on the general labor problem. But if he will consult those of his fellows who have visited China and engaged in the newspaper business in that country, he will find that the life of an editor over there is not a happy one. It is to me very remarkable that the American papers have succeeded in obtaining among the Filipinos, knowing only Spanish or Tagalog, so many printers who can set up English; but whatever their failings and abilities, the whole labor problem does not turn on them. Strikes and unreasonable demands by printers are not unknown in the United States, and the soul of many an editor in the States has been seared with blasphemy, caused by what he regards as the shiftlessness and unreliability of printers. We have been successful in securing, and now have, more than 2,500 Filipino laborers at work on the Benguet road. The Atlantic, Gulf and Pacific Company has from 600 to 700 native laborers in their quarries, and Mr. Krusi of that company told me they were doing most satisfactory work. The quartermaster's department of the United States Army in Manila employs about 1,500 Filipinos; the city engineer's department of the city and the street-cleaning department of the city employ together probably an equal number, and they all report that the Filipino labor is good. Mr. Higgins, the manager of the Manila and Dagupan Railway Company, who built the original road with Filipino labor and is now building the branches authorized by the Commission, finds no difficulty with Filipino labor. Mr. Belden, of the street railway company, has had no difficulty in securing the laborers necessary, and they are now at work laying the ties. Captain Coudon, of the Cavite Navy-Yard, submits a favorable report upon his use of Filipino labor, skilled and unskilled.

"I venture to say that these citations, until others are shown indicating a different condition of affairs, are sufficient to sustain the fact that Filipino labor, when properly managed, can be made to do the work that this country requires, not so well as American or Chinese labor, but fairly well."

This is a conservative opinion by one who, as governor of the archipelago, visited all parts of it, and to whom all sources of information were open. There is no doubt but that the Filipino laborer has much to contend with, more especially in the provinces, but as the field of his usefulness widens and he realizes that he is something more than a mere drudge, and with examples of American industry to weaken his prejudice against manual labor as undignified and unmanly, and to excite his pride and steady his application, and with just treatment and fair wages, it is not unreasonable to assume that the Filipino of the provinces can and will become as good a workman as he has proved to be in Manila or as the Tropics can produce and by his labor add greatly to the material prosperity of his country.

The rates of wages which have prevailed since American occupation, while low, as compared with wages in the United States, have been substantially double those paid under Spanish dominion. In Manila the wages of workmen employed by military authorities were usually fixed in United States currency, but in practically all other cases they were in the currency of the country—the Mexican dollar, or peso.

The census supervisors in the organized provinces reported the average wages paid certain occupations prior to 1898 and in 1902 in local (Mexican) currency, which are presented in the two following tables.

These meager tables of wages show very clearly the limited number of wage-earning occupations in which Filipinos were engaged throughout the provinces, both prior to and at the date of the census. In Manila there was a much larger number of occupations, but the Chinaman, with his gainful instincts, his indifference to his surroundings, his persistence and greater skill, has always been largely in evidence in Manila, and ready to compete successfully with the Filipinos in nearly all the trades, and thus drive them to occupations of a much lower and much less profitable kind.

Average wages paid Filipino workmen in Manila prior to 1898 and in 1902, in local (Mexican) currency, by the day and by the month, in the occupations specified.

Occupation.	Average wages paid prior to 1898 (pesos).		Average wages paid in 1902 (pesos).	
	Per day.	Per month.	Per day.	Per month.
Accountants.....		30.00		80.00
Bakers.....		15.00		25.00
Bakery foremen.....		20.00		35.00
Bamboo and rattan furniture makers.....	0.75		2.00	
Band musicians.....	2.50		5.00	
Barbers.....		20.00		30.00
Barbershop foremen.....		20.00		30.00
Blacksmiths.....	1.50		3.00	
Blacksmiths, foremen.....	2.00		4.00	
Boat builders.....	1.00		2.00	
Boat builders, foremen.....	2.00		4.00	
Boatmen.....	.50		1.50	
Bookbinders.....	.25		1.00	
Bookbinding foremen.....	1.00		2.00	
Brickmakers.....	.37		1.00	
Brickmakers, foremen.....	1.00		2.00	
Brick masons.....	.62		1.00	
Brick masons, foremen.....	1.00		2.00	
Butchers.....	1.00		3.00	
Cabinetmakers.....	2.00		4.00	
Cabinetmakers, foremen.....	2.00		5.00	
Candle makers.....	.75		1.50	
Candle makers, foremen.....	1.50		4.00	
Carpenter.....	.62		1.50	
Carpenters, foremen.....	1.00		2.50	
Carriage blacksmiths.....	2.00		4.00	
Carriage carpenters.....	1.25		2.50	
Carriage factory foremen.....	2.00		3.50	
Carriage leather workers.....	.75		2.00	
Carriage painters.....	1.00		2.50	
Carriage wheelwrights.....	1.00		1.75	
Cart builders.....	.75		1.50	
Cart builders, foremen.....	2.00		3.50	
Cart wheelwrights.....	.75		1.50	
Chocolate makers.....		15.00		35.00
Chocolate makers, foremen.....		25.00		45.00
Cigar-box factory foremen.....	.75		2.00	
Cigar-box fillers.....	.80		2.00	
Cigar-box makers.....	.50		1.50	
Cigar-factory foremen.....		35.00		80.00
Cigar sorters.....	.80		2.00	
Cigarette packers.....	.50		1.00	
Cigarette makers.....	.40		1.37	
Cigar makers.....	.80		2.00	
Clerks.....		25.00		45.00
Coachmen.....		15.00		30.00
Compositors in printing establishments.....		15.00		40.00
Confectionery makers.....		15.00		25.00
Confectionery makers, foremen.....		30.00		50.00
Cooks.....		15.00		30.00
Day laborers.....	.37		.80	
Distillery foremen.....	.75		2.00	
Distillery workmen.....	.75		1.50	
Draftsmen.....	2.00		4.00	
Dressmakers.....		200.00		200.00
Fishermen.....	2.00		3.00	
Hand sawyers.....	.75		1.50	
Harness makers.....	.62		2.00	
Harness makers, foremen.....	1.50		3.00	
Hat makers.....	.40		.80	
Hatmakers, foremen.....	.75		1.50	
Horseshoers.....	.50		1.00	
Horseshoers, foremen.....		30.00		45.00
House and sign painters.....	.80		1.50	
House and sign painters, foremen.....	1.00		3.00	
House servants.....		10.00		15.00
Iron-foundry foremen.....		125.00		250.00
Iron ladlers.....	.75		2.00	
Iron molders.....	1.50		3.50	
Iron polishers.....	2.50		3.50	
Laundry foremen.....	.40		.80	
Laundrymen.....	.20		.50	
Lithographers.....	.40		1.00	
Lithographers, foremen.....	1.25		2.50	

Average wages paid Filipino workmen in Manila prior to 1898 and in 1902, in local (Mexican) currency, by the day and by the month, in the occupations specified—Continued.

Occupation.	Average wages paid prior to 1898 (pesos).		Average wages paid in 1902 (pesos).	
	Per day.	Per month.	Per day.	Per month.
Machinists.....	.40	—	1.00	—
Machinists, foremen.....	1.00	—	2.50	—
Pottery makers.....	.37	—	1.00	—
Pottery makers, foremen.....	.37	—	1.00	—
Printing-office foremen.....	—	45.00	—	120.00
Rope makers.....	.75	—	2.00	—
Saddlers.....	.75	—	2.00	—
Saddlers, foremen.....	.75	—	2.00	—
Sailors.....	—	12.00	—	24.00
Salesmen.....	.60	—	2.00	—
Seamstresses.....	.20	—	.40	—
Shirt makers.....	.50	—	1.00	—
Shirt makers, foremen.....	1.00	—	2.00	—
Shoemakers.....	.75	—	2.00	—
Shoemakers, foremen.....	.75	—	2.00	—
Silversmiths.....	.75	—	1.25	—
Silversmiths, foremen.....	1.25	—	2.25	—
Soapmakers.....	.75	—	1.50	—
Soapmakers, foremen.....	.75	—	1.50	—
Spinners.....	.50	—	1.50	—
Stationary engineers.....	—	90.00	—	125.00
Stationary firemen.....	—	12.00	—	28.00
Steam sawmill foremen.....	—	25.00	—	40.00
Steam sawyers.....	1.00	—	2.00	—
Steamboat engineers.....	—	80.00	—	150.00
Steamboat firemen.....	—	12.00	—	28.00
Stonecutters.....	.62	—	1.00	—
Stonecutters, foremen.....	1.00	—	2.00	—
Stone masons.....	.62	—	1.00	—
Stone masons, foremen.....	1.00	—	2.00	—
Tailors.....	.75	—	2.00	—
Tailors, foremen.....	—	30.00	—	80.00
Teachers.....	—	25.00	—	120.00
Tinsmiths.....	.60	—	1.00	—
Tinsmiths, foremen.....	1.00	—	3.00	—
Trunk makers.....	.50	—	1.00	—
Trunk makers, foremen.....	2.00	—	3.00	—
Umbrella makers.....	.50	—	1.50	—
Umbrella makers, foremen.....	1.00	—	2.00	—
Watch repairers.....	.75	—	2.00	—
Weavers.....	.50	—	1.50	—
Wood sawyers.....	.75	—	1.50	—

Inquiry was made, through schedule No. 5, relating to "social statistics," as to the wages paid in a few occupations, to wit: Farm laborers, ordinary laborers, carpenters, masons, painters, and blacksmiths. The information secured upon this subject is presented in the following table, which shows the average wages paid employees in the occupations specified, at the time of taking the census in 1903, in the different provinces. It should be stated, as to farm laborers, that while the table shows the average money compensation paid them per day, the usual custom throughout the islands is to pay them with a share of the products of their labor; the payment of wages in money to this class of employees is exceptional.

1002 LABOR CONDITIONS IN THE PHILIPPINE ISLANDS.

Average daily wages paid in specified occupations, by provinces and comandancias in 1903.

Province or comandancia.	Average wages per day, in pesos, of—					
	Farm laborers.	Ordinary laborers.	Carpenters.	Masons.	Painters.	Blacksmiths.
Philippine Islands.....	0.55	0.51	0.90	0.89	1.06	1.11
Abra.....	.30	.24	.44	.52	.40	.50
Albay.....	1.01	.89	1.41	1.49	1.88	2.19
Amboi Camarines.....	.82	.57	1.11	1.10	1.38	1.45
Antique.....	.52	.30	.51	.42	.71	.....
Basilan *.....	.63	.50	.69	.....	.....	.50
Bataan.....	.71	.54	1.04	.99	1.01	2.00
Batangas.....	.42	.42	.70	.79	.94	.92
Benguet.....	.20	.70	.54	.....	.....	.50
Bohol.....	.59	.49	.83	.54	.99	.94
Bulacan.....	.73	.62	1.01	.99	1.23	1.12
Cagayan.....	.71	.60	.86	.49	.99	1.04
Capiz.....	.33	.26	.49	.52	.67	.83
Oavite.....	.67	.79	1.22	1.20	1.45	1.35
Cebu.....	.42	.32	.60	.56	.79	.95
Cottabato *.....	.51	.50	.95	.98	1.00	.83
Dapitan *.....	.50	.48	.94	.75	.....	.....
Davao.....	.26	.25	.68	1.00	.....	.75
Ilocos Norte.....	.43	.33	.51	.63	.74	.71
Ilocos Sur.....	.46	.35	.67	.59	.84	.79
Iloilo.....	.44	.31	.53	.70	.82	.92
Isabela.....	.96	.72	.91	1.25	1.21	1.10
Jolo *.....	.40	.40	1.50	1.50	1.50	1.50
La Laguna.....	1.02	.93	1.36	1.31	1.47	1.45
La Union.....	.72	.50	.90	.91	.97	.90
Lepanto-Bontoc.....	.23	.21	.43	.50	.....	.75
Leyte.....	.70	.86	1.45	1.33	1.64	1.72
Manila City.....	1.00	.80	2.00	1.50	2.00	2.50
Marinduque *.....	.60	.49	.93	1.75	1.05	1.75
Masbate.....	.54	.65	1.06	1.25	2.00	1.10
Mindoro.....	.37	.35	.55	.58	.68	.75
Misamis.....	.58	.66	.97	.74	.81	1.15
Negros Occidental.....	.33	.37	.54	.67	.91	1.05
Negros Oriental.....	.33	.34	.65	.63	.63	1.09
Nueva Ecija.....	.43	.40	.70	.63	.83	.90
Nueva Vizcaya.....	.33	.33	.58	.75	.58	.78
Pampanga.....	.78	.43	.65	.78	1.01	.78
Pangasinan.....	.53	.45	.70	.71	.79	.76
Paragua.....	.25	.26	.33	.28	.25	.38
Paragua Sur *.....	.31	.50	1.00	.28	1.60	1.00
Rizal.....	1.09	.79	1.33	1.35	1.38	1.41
Romblon.....	.43	.55	.73	.68	.83	1.17
Samar.....	.67	.87	1.21	1.04	1.38	1.69
Sisal *.....	.25	.25	2.00	.....	.....	.....
Sorsogon.....	.88	.99	1.40	1.36	1.50	1.73
Surigao.....	.45	.25	.97	1.00	1.10	1.01
Tarlac.....	.55	.52	.82	.81	.94	1.00
Tayabas *.....	.71	.66	1.17	1.21	1.71	1.62
Zambales.....	.96	.37	.50	.62	.75	.86
Zamboanga *.....	.52	.52	.78	.80	.81	.94

* Comandancia.

* Subprovince of Tayabas.

* Exclusive of subprovince, Marinduque.

[From Senate Document No. 277, Fifty-ninth Congress, first session, hearings before the Committee on the Philippines of the United States, p. 457.]

COMMITTEE ON THE PHILIPPINES,
UNITED STATES SENATE,
Washington, D. C., February 5, 1906.

STATEMENT OF HON. WILLIAM H. TAFT, SECRETARY OF WAR.

Secretary TAFT. * * * In the first place, we have had a great deal of talk here about Chinese labor. There is absolutely no Chinese labor engaged either in sugar or tobacco, on the farm or in the factory. I say that without hesitation. There are some nineteen Chinese factories, I believe, for tobacco manufactures in Manila, but there are no Chinese workmen in those factories. Now,

as illustrating the danger of statistics, before you have a census, and before you have made an investigation, I went before the Foreign Affairs Committee, having been called there by Mr. Hitt, and was interrogated as to the number of Chinamen in the islands.

The labor unions were very much troubled about the presence in those islands of Chinamen, whose presence there they regarded as a threat, and one gentleman, representing the union, stated that there were a million and a half Chinamen in the islands, and I was asked as to that. Well, I did not know. I had to guess as to that, as I did on every other subject of a statistical character with respect to the islands at that time. That was at the same time that I appeared before the committee here for thirty days. I ventured the statement that there certainly were not more than 300,000 Chinamen in the islands. I said that the board of health census showed that there were not more than 60,000 in Manila, and certainly I thought I could guarantee that they did not exceed 200,000. Well, what does the census show? It shows that there are about 27,000 in Manila, and that there are not more than 50,000 in the entire archipelago. Not only that, but it shows that in the agricultural labor in the islands there is not more than 2½ per cent of other than Filipino labor.

Mr. WELBORN. Two-tenths of 1 per cent.

Secretary TAFT. Two-tenths of 1 per cent other than Filipino labor. The Chinaman is a merchant. He goes to the islands and works on the wharves in Manila at \$14 silver a month, and he saves out of that about \$17 or \$18 a month, and at the end of a year he has a capital which enables him to set up a business, and he puts his store right down next to a Filipino woman, for the women do the storekeeping in the Philippines, and he drives that woman out of business in six months. That is what explains the very great hostility to the Chinamen in the Philippines and what also explains that there is not the slightest danger from Chinese labor in those islands.

You introduce the Chinamen into those islands, and you will have a revolution on your hands in a minute. The political reason, if there were no other, is an absolute bar to the admission of Chinamen under any other restrictions than those contained in the present very radical and stringent exclusion law. The truth is that the Chinaman is adapted to labor in the fields, where that labor involves great patience, attention, and deftness. He is a truck gardener by nature, and truck gardening, because it requires patience, attention, industry, and constant watchfulness, is a very profitable business if you get that kind of a man to work it. So there are a few Chinamen engaged in truck gardening in and about the profitable market of Manila, but there is not, I could almost say, another Chinaman engaged in agriculture in the Philippine Islands.

Now, the Japanese labor which comes to the islands we have to pay a dollar a day for in gold. That is what is paid by Mr. Welborn on his agricultural place in Benguet, where he has a test farm; that is what is paid in the mines in Batan, where the Government has been experimenting with respect to mining; and that is what is paid by the hemp people, who attempted to import Japanese into the hemp fields, or rather into the hemp-pulling industry. The minute that you increase the demand for that kind of labor you increase the price, and, therefore, what fear is there of Japanese labor at a dollar in gold to-day in the Philippine Islands?

Senator BEVERIDGE. May I ask, Mr. Secretary, why do you employ this Japanese labor on the test farm at a dollar a day instead of the native Filipino labor? Is it because the native Filipino labor is not equal to the task?

Secretary TAFT. I want to say with respect to the Filipino laborer that he is a laborer who needs instruction. I have great hope that the Filipino laborer will become much more effective than he is to-day, and I have that hope from the experience that the Government has had with him, from the experience that has been had with him in the construction of the Manila port works, and from the experience that the street-railway company had with him in constructing the street railroad in Manila.

Senator BEVERIDGE. At present he would not be considered an efficient laborer?

Secretary TAFT. Oh, no, sir; I do not think so.

Senator BEVERIDGE. He would not be a competitor with the labor of the Japanese or Chinamen, and much less with that of the Americans?

Secretary TAFT. That is true. Where you get them in large bodies, as in Manila—for they usually come to the city—you can get even now, with American foremen to supervise them, you can get an instruction of the labor, and finally they make what, for tropical laborers, are efficient men, but that has to

be done by building a village for them, and putting in a church, and putting in a cockpit, and putting in bands who play every night, and putting in schools and making them comfortable, and treating them as you ought to treat them; but the minute that an American calls on them, I do not care where it is, to labor, just that minute their demand is for higher wages.

Senator BEVERIDGE. In addition to all that, is it not true that this labor that you speak of, flocking to the centers, like Manila, is really the picked labor of the islands so far as intelligence is concerned?

Secretary TAFT. It is certainly the most enterprising, and presumably the better class.

Senator BEVERIDGE. And therefore much superior to the common labor out through the country?

Secretary TAFT. Yes, sir. Now the question as to the cost of labor in the islands is a question that it is absolutely impossible to answer with certainty. There has been in the islands for a great many years—in all parts of the islands, and its effect continues—a certain sort of peonage. The peonage was of this character: A man had a plantation and gathered about him a number of servants, men who worked for him; they had families, and he furnished them shacks in which to live. Then he furnished them food and such clothing as they needed, and he kept an account against them in such a way that they all grew into his debt. Then the children came on and they were compelled to recognize the debts of the fathers, and that indefinable, possibly, but certainly indissoluble bond, continued. On that plantation a man has a sugar plantation, for instance; the man has a great many dependents of that sort. The land has come down to him; his father owned the plantation before him, and his grandfather before him.

Now with respect to those servants, it is absolutely impossible for him or them to tell what their wages are. If you have a benevolent man at the head of them, he treats them generously, and if you do not he does not. But they are in such a situation of dependence that they are absolutely under his control. That system was favored in Spain. There was nothing in the Spanish régime that was aimed to give to those people an interest in their own rights and a kind of independence of the planter. Now that we have come in there is a changed feeling among that class, and although it is difficult to teach them what their rights are, there is a growing independence of their former masters. But that labor which the planter has on his plantation is by no means enough to carry on his agricultural operations during the year. He has to go out and get other labor, and so in Negros he has to go to Antique and Capiz and down to Bohol and into Cebu to get laborers, and when they come he has to pay the expense of their transportation, and he has to pay a higher wage. The minute that an American appears on the ground for the purpose of carrying on sugar plantations that minute the wages go up, and the larger the number wanted the higher they will go.

It is absolutely absurd to say that the labor market in Manila is not more sensitive than the labor market in the United States. As ignorant as those people are, they take in a fact affecting such a thing as the price of labor easily, and it spreads like wildfire by whispering from one to another. I have seen a letter from Mr. Wheeler, whom I know—he is the head of the company that is engaged in lumbering in the north of Occidental Negros—in which he tells about the increase of wages with him, because he asked for 200 laborers. It was at first 25 cents gold a day, and now it has gone up to 37½ cents a day, and he has to give them shacks to live in, and has to transport their rice from Manila, and he has also to give them other privileges. Besides, he gets part of the labor in Panay and transports it free to his place. Therefore to say that the labor in the Philippines is 6 cents or 10 cents or 15 cents a day, and to calculate on that what the cost of sugar is, or will be in the future, is utterly absurd.

Senator BEVERIDGE. At that point, Mr. Secretary, I would like to interrupt you to ask you two or three questions. The attempt has been made in these hearings to show that the American laborer engaged in the production of beet sugar and other similar things is in danger of free competition with the Filipino laborer. It has been shown here, as we all know, that the American farmer works from twelve to fourteen hours a day. How many hours does the ordinary laborer in the Philippines work?

Secretary TAFT. Well, it is a little difficult to answer that. You get the impression—

Senator BEVERIDGE. Does he work in the midday at all?

Secretary TAFT. You get the impression as you go through the country that he does not work at all, because ordinarily, when you reach a town at 10, 11, or 12 o'clock, you see him sitting up in the front window with his wife, and they are both smoking, and the children are playing about them, and you think he is not in the fields at all. As a matter of fact, they rise very early in the Philippines. Ordinarily they get out at daylight in the morning, and they do their work from then until 8 or 9, and in the afternoon they return again, in some cases, say 3 or 4 o'clock in the afternoon, and then they return and work until dark.

Senator BEVERIDGE. That is to say, they work about eight hours, then—from 4 to 9 in the morning, which is at most five hours—

Secretary TAFT. Unless they are under training they do not work any more than they have to. That is entirely true.

Senator BEVERIDGE. I want to get the basis of comparison with this supposed menace to the American labor in competition with the Philippine labor. If they work at all, they would work from about 4 in the morning—that is, about daylight, up to about 8 or 9 o'clock, and then in the afternoon from the time it becomes suitable to be out of doors, until dark again. So, all told, they would work, if under strict discipline, about eight hours a day?

Secretary TAFT. No; I think they could be trained to work right through the middle of the day.

Senator BEVERIDGE. Do they work through the middle of the day?

Secretary TAFT. That depends on what they are working for.

Senator LONG. And upon their industry?

Secretary TAFT. Yes, sir.

Senator BEVERIDGE. What I am asking for is the comparative number of hours that they work now with reference to the number of hours which we all know the American farmer works.

Secretary TAFT. Well, under normal conditions, where they are under the influence of a man who treats them as they ought to be treated and understands their nature, I would not say that they did not work as long as an American farmer. My impression is they must have—or all of them do have, and a man who would prevent them from doing it would make a fool of himself—they must have a siesta in the middle of the day. But that is a ceremony that takes very little time in preparation for it, for they can sleep on the edge of a board with a brick for a pillow and enjoy it quite as much as we enjoy it under a heavy covering on a cold night.

Senator BEVERIDGE. I wish to inquire, on that point, as to the productive quality of their labor as compared with that of the American farmer.

Secretary TAFT. That can be very greatly improved, and of course it is not difficult. Generally it is much dearer per unit of work product than in America, although not in all cases.

[From hearings before the Committee on Ways and Means, House of Representatives, January 23-28, and February 3, 1905, p. 195.]

COMMITTEE ON WAYS AND MEANS,
HOUSE OF REPRESENTATIVES,
Washington, D. C., January 28, 1905.

STATEMENT OF HON. WILLIAM H. TAFT, SECRETARY OF WAR.

Secretary TAFT. A recommendation was made three years ago by the Commission with respect to getting in Chinese skilled labor. That recommendation arose from a desire on the part of the Commission to encourage the construction of ships in Manila Harbor, and the skilled shipwrights were not sufficient in number among the Filipinos to justify the investment of capital by Americans and some foreigners in two or three shipyards in Manila. Therefore we made that recommendation. As a matter of fact, the Commission as a whole is utterly opposed to the introduction of Chinese labor into these islands at all, and so am I, as an individual. The measure that was proposed would have been not at all harmful, because the Chinamen would have to come in under a bond, and the skilled laborers were to be returned to China at the end of five years. It was for the purpose of beginning the industry and teaching the Filipino apprentices a trade. But Congress did not see fit to give us the opportunity.

Now, as happens if one waits, the remedy has been found, and Filipinos are increasing in the skilled arts. They are very skillful with their hands, and what with industrial schools and the Chinamen we already have in the islands, we are gradually getting carpenters and other skilled mechanics from among the Filipinos.

The whole policy of the administration and the Commission is against the introduction of Chinese labor into those islands; but not because of the fear, as in the case of these gentlemen, that coolies would go onto the sugar plantations. The truth is that you could not drive a Chinaman onto a sugar plantation in the Philippine Islands.

You can not get a Chinaman into a tobacco plantation. The minute that he lands he becomes a porter or a shopkeeper. If he has not a little capital so that he can set up a shop, unless he be a skilled laborer—in which case he goes to making houses, or something of that sort—he earns 10 or 15 pesos a month, and out of that 10 or 15 pesos he seems to save about 20 pesos a month, and at the end of a year he sets up a store next door to the store of a Filipino woman, and at the end of a year he drives her out of business. Now, I have heard, since I have had the honor of appearing before Congressional committees year after year, the statement with respect to the number of Chinamen in the Philippine Islands, diminish and diminish and diminish.

Before the Foreign Affairs Committee, of which Mr. Hitt was chairman, some gentlemen of the labor unions appeared and testified in favor of the extension of the Chinese exclusion act over the Philippines, and also in favor of its being applied in this country against the Philippines, because there were one and a half millions of Chinamen on these islands, and therefore to let in immigration from those islands would involve a transfer of Chinese into this country. It has been said here that there are 60,000 Chinamen in the city of Manila. That has been stated to this committee. I supposed at one time there were that many. I supposed that the number of Chinamen in the Philippine Islands would perhaps reach 150,000 or 200,000.

As a matter of fact, the census shows that the number of Chinamen in the city of Manila is 25,000, and I doubt if the entire number of Chinamen in the entire archipelago is more than 75,000; and there is not a Chinaman out of that 75,000, not a single one, who would work in a sugar or tobacco field or in a cocoanut field or in any agricultural pursuit, except possibly in the cultivation of a few truck gardens in the vicinity of Manila. In Borneo they have attempted to give land for the cultivation of sugar and tobacco to any Chinamen who would come there and take it. They have sent agents to invite them to come down there and go into the fields. They can not get them into the fields.

General Davis was told by the governor of Borneo that every effort had been made to get the Chinaman into the fields of Borneo, and that it was impossible to get him there. He knows a better thing. He knows that he can make more by going into trade, and can live better if he lives as a porter or a shopkeeper. So that this fright of cooly labor is another of the chimeras. First, there are only 75,000 Chinamen in the islands; and secondly, not one of them can be induced to work in a tobacco or sugar field; and thirdly, we do not intend to let a Chinaman in there. The reason is not because of the competition of labor. That is not the reason the Filipino people are down on them. They do not fear competition of labor. What they fear is the competition in business, and they look to the example and the illustration of the danger in the Straits Settlements. When the English went there they let the Chinamen in. There are now more Chinamen than Malays in the Straits Settlements, and they own the Straits Settlements. They do not own the mines, because the Government owns those and charges a royalty, but they do all the business, and the Malay is relegated to an inferior and altogether negligible condition.

Now, it seems to us that it would be the grossest breach of a trust were we to open those islands to the settlement of Chinamen and drive the Filipinos to the wall in their own country. I do not mean to say that if we were to open the islands to the Chinaman the islands would not be developed much more rapidly than now, but under the development now it will be the development of the islands for the Filipino and not for the Chinaman. So that that fear of cooly labor is altogether unfounded.

Mr. WILLIAMS. With regard to the measure before us, there is nothing about the introduction of Chinese at all?

Secretary TAFT. No, sir.

Mr. WILLIAMS. Nothing of that sort is now asked or thought of?

Secretary TAFT. No, sir; the recommendation as to the importation of a few Chinese skilled laborers was contained in the report of the Commission three years ago, and nothing has been requested since.

I may say this, as illustrating the condition of labor: There was a 60,000-acre tract of land belonging to the Augustinians which we bought in the friars' purchases, and I was making inquiries of the manager of the Tabacalera Company, which is the largest company in the archipelago, as to what that hacienda was worth. It lay just in the neighborhood of a hacienda of the Tabacalera Company. He said that if the Commission would let him introduce Chinese labor to build his houses and factory and equipment and take the labor onto that hacienda he would give me a very handsome price for it, but with the condition of labor, and especially the condition of labor in Isabela and Cagayan, he would not give anything for it. He was also under a wrong impression as to the use he could put Chinese in the agricultural field. Of course his statement was an exaggeration, but it illustrates the labor conditions in the islands. They have to import, as I say, into Negros half of their labor each year for six months.

Mr. WILLIAMS. Now, on the cost of labor in the Philippines; have wages been increasing every year since the American occupation, or not?

Secretary TAFT. Yes, sir.

Mr. WILLIAMS. How are they as compared with what they were when you first went there?

Secretary TAFT. We went about the islands, into every province of the 40 in the islands, in 1901, and wages had doubled over those in Spanish times in every province into which we went during that trip. Since that time, in some provinces where they have had practically a famine, wages have fallen off; but wherever there have been normal conditions wages have crept up, for the reason that there has been so much greater demand. In Manila the army quartermaster has 3,000 men; then there is a street railway being constructed in Manila, and that has raised the price of labor in Manila, I think, probably 25 per cent, perhaps more than that, and then there is the work on the Manila Harbor.

Of course this does not affect labor in all the islands, but the local rise due to it is illustrative of the kind of effect that will come with the introduction of railroads and with the development of the country as we go on. And this argument of our opponents, as I understand it, Mr. Williams, assumes a marvelous development of the country with respect to the sugar production. Of course if that development is to come, it will be accompanied by a development in the hemp industry and a development in other ways, and the limitation, therefore, that the price of labor will necessarily have on the production is a serious and actual one.

Mr. WILLIAMS. And it will become more serious each year.

Secretary TAFT. Yes, sir.

Mr. WILLIAMS. Has the supply of sugar and the number of people engaged in sugar production increased?

Secretary TAFT. Yes, sir; in the last year from 83,000 tons to 140,000 this year; but in 1893 it was 240,000 tons, so that it fell off for some years. You have been advised already of the very high prices that have to be paid for hemp laborers, going up, as I have already said, to 4 or 5 or 6 pesos a day. And we are advised of that, too, in trying to get men to work for the public in various provinces. In some places it is impossible to get them to work on the roads, because of the high price to be paid for labor.

There is one subject that I touched upon this morning, about which I would like to be permitted to say a word or two more; that is the general subject of labor,

Labor in the Philippine Islands has the characteristics of labor in nearly all the Tropics. The laborer in the Tropics ordinarily is not what would be called industrious to the extent that laborers are in the Temperate Zone. There are some exceptions to this. The laborer in Java, by reason of the compulsory form of labor which has long prevailed there and by reason, too, of the necessity that he is under of raising food enough for 23,000,000 of people in a small island like Java, is an industrious laborer; but that is not true of the Philippine laborer. On the other hand, he is capable of instruction; he does better work for better wages.

The first result of giving him better wages is to have him work less days a week. He is something of a philosopher, and at first if he can earn enough in

two days in a week to last him a whole week he works only two days and remains idle the other four. As he comes to learn that now he may keep what he saves and as things he regarded as luxuries come to be regarded by him under the American régime as necessities he is furnished a motive for labor. No man labors for the fun of it; he works for the purpose of getting that which he wishes to live on. Now, the Philippine laborer has been condemned in extreme terms for laziness by many of the foreigners and by the Americans who have been used to American standards of labor. In order to meet these extreme, erroneous, and unjust statements the Commission and the members of it at various times have made reports on the subject.

The Philippine laborers, when aggregated in gangs under white foremen and superintendents, can be trained to do fairly good work. It was supposed that they could not be used for railroad work or road work or quarry work. But experience in Manila and in the large works of construction about Manila justifies the belief that they can be trained to better work than they have been heretofore in the habit of doing. The quarry which is supplying stone for the construction of the great harbor works in Manila is now mined by Filipino labor. When they first came there the contractors attempted to use Chinese labor, but they found the Chinese laborer was not satisfactory. It was expensive, because under the Chinese exclusion laws the Chinamen lawfully there were disposed to ask for higher wages and for greater privileges, because the Chinaman readily finds out his value in the market and what facts are with respect to that which he has to sell.

Finally Mr. Krusi, the vice-president of the company, concluded to make an experiment. He erected a number of inexpensive houses, put up near the quarry a church, a theater, a cockpit; he hired a band, he had schoolhouses and school-teachers, and he established a little community. And then he invited the Filipino laborers to come in there with their families; and for two or three years he has conducted a labor colony there from which he has drawn a thousand laborers, who have continued to work and have been to him, for tropical labor, quite satisfactory. So, too, in the custom-house it has been found by the collector of customs that Filipino laborers can be trained to be fairly satisfactory workmen. I ought to say that Krusi employs in his quarry about 8 per cent of white labor—that is, 8 per cent of foremen. It is found that unless a foreman is willing to get down and work himself from time to time, to show his men how to work, he does not serve the purpose; but with that the Filipino laborer can be made fairly satisfactory. So, on the Benguet road, which is a work of great construction that we have been undertaking, we have had some 3,000 Filipino laborers and about a thousand Japanese; and we have also tried for awhile 500 or a thousand Chinamen. The Chinamen used opium to such an extent and were so difficult to manage that we got rid of them, and the road is now being constructed by Filipinos and Japanese.

MR. WATSON. Is that a macadamized road?

Secretary TAFT. Yes; but it involves the cutting down of cliffs. It is built along a canyon, and it is a road that runs from the lowlands to the height of 6,000 feet up the Bued River canyon, and it involves the removal of some very high cliffs of stone, which is of a shaly character; so in order to prevent sliding the inclination of the slope must be made gradual, and the cutting has to be very extensive and large. They have to cut up and back two or three hundred feet in order to get a proper slope. I ought to say that the street railway company has been able to build and lay its tracks in the city of Manila, as I am informed, at a rate that is perhaps 33 per cent less than the price of laying track in an American city would be. So the Filipino laborer thus organized and under American foremen has something of a future.

On the other hand, labor of this sort in agriculture is a labor which the communities have always been used to. They are an agricultural people. But they are also a people given much to amusement, and they have about sixty festa days in every year in addition to the regular Sundays. They are not constant in their attendance at work. They will come Tuesday instead of Monday, and sometimes Wednesday instead of Tuesday. Nevertheless, I think the truth lies between the statement which assumes that they are equal to the Temperate Zone laborers on the one hand and to that condemnatory statement that says that they are worth nothing on the other. But the limitations upon labor—I mean the limitations which the short supply of labor necessarily puts upon the production of sugar, which requires a great deal of labor, or any other crop needing labor—are obstacles to a tremendous expansion of any of the products of the islands, and especially to sugar and tobacco.

[From Engineering News, Nov. 23, 1905.]

LABOR CONDITIONS IN THE PHILIPPINE ISLANDS.

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This paper is presented for the purpose of showing briefly some of the essential conditions surrounding the labor problem in the Philippines, a knowledge of which would be of value to the engineer or contractor contemplating public works in those islands. The subject is particularly appropriate in view of the harbor improvements now in progress at Manila, Cebu, and Iloilo, which will together involve an expenditure of about \$5,000,000; the new sewer and water systems, and the railroad projects, involving an estimated cost of about \$4,000,000 and \$30,000,000, respectively, both of which are now under advertisement; and other more or less extended and much-needed public improvements which must be prosecuted in the near future.

That portion of the paper relating to the characteristics of the Filipino is written with special reference to that class of the Filipino people from which are drawn the unskilled laborers, without whose assistance the development of agriculture and the prosecution of public improvements would be impossible. It is to be noted that it is that class with which the American people are especially concerned in their repeated enunciation of the governmental policy of the "Philippines for the Filipinos," a "square deal," and "equal rights for all."

* * * * *

There are in the Philippines two main classes of people—the *gente ilustrado*, or the higher class, and the *gente baja*, *tao*, or the lower class. The middle class, that predominating and important class in the affairs of the United States, is practically lacking. The degree of literacy may be taken as a fair criterion by which to distinguish these two classes. The following statement from the Census Report for 1903, Volume II, page 78, applies to those who were able "to read and write in any language—English, Spanish, or a Malay tongue * * * ."

"Those who were able to read but not write numbered 1,208,845, which was 24.3 per cent, or a little less than one-quarter of all the inhabitants 10 years of age and over. Those able to both read and write numbered 1,002,588, and constituted 20.2 per cent, or about one-fifth of those who were at least 10 years of age. In this part of the population was included a small element who had received superior education. They numbered only 76,627, or 1.6 per cent of the population over 10 years of age."

Those having received a superior education represent fairly closely the higher classes, a discussion of whose characteristics is not attempted in this paper.

Another classification of the Filipino people is that of civilized and wild people. The civilized tribes form 91 per cent of the total population, and of this proportion the Visaya, Tagalog, Ilocano, and Bicol form 46.8, 21.2, 11.7, and 8.2 per cent, respectively, a total of 88 per cent of the civilized people. While these various tribes and classes differ materially in traditions, habits, and dialects, not only with each other but also among themselves, yet the influence of the Spanish church and Government during the past three centuries has created a similarity in customs and in types of dwellings.

Published accounts, both official and unofficial, present such a variety of conflicting opinions regarding the Filipinos as to compel the remark that no general statement—except fundamental truths applicable to all mankind—can be made applicable to all tribes. The numerous dialects and customs characteristic of almost every barrio or small village, the exclusiveness of each settlement or the lack of intercommunication between settlements, the various racial characteristics of the somewhat large *mestizo*^a portion of the population, and the broad division between the high and low classes may be sufficient reason for such discrepancies in the opinions of travelers and other observers.

The principal agricultural products of the islands are hemp, or *abaca*, sugar, tobacco, coconuts, coffee, rice, cacao, lumber, dyewood, fruits, vegetables, etc. The principal building materials are poles or bamboo for the framework, *nipa* palm or grass for the roofing, and the same material or split and woven bamboo

^a Offspring of mixed parentage. A large percentage have a Filipino mother and a Spanish or Chinese father.

1010 LABOR CONDITIONS IN THE PHILIPPINE ISLANDS.

for the siding, and bejuco or rattan for binding. Nails and bolts are never used in the construction of the simple native dwellings.

The manufactured products throughout the islands for the year 1902 aggregated in value ₱35,097,209, of which 67.2 per cent were made in Manila. The number of persons employed in manufacturing establishments was 34,659. Valuable information on products—both agricultural and manufactured—is contained in the 1903 census of the Philippine Islands, from which Table IV is taken.

TABLE IV.—*Philippine manufactures, by industry groups, 1902.*

Industry group.	Number of separate industries.	Number of establishments.	Capital.	Cost of materials purchased.	Value of products.
All industries.....	68	2,184	₱36,226,085	₱25,049,452	₱35,097,209
Group 1. Food and kindred products....	5	456	1,721,976	2,228,908	3,417,148
Group 2. Textiles.....	11	230	896,483	776,118	1,600,776
Group 3. Metal products.....	8	161	1,054,346	480,090	1,296,816
Group 4. Lumber and its manufactures.....	8	133	2,395,754	1,596,262	3,177,606
Group 5. Leather and its products.....	4	219	686,135	525,825	1,132,556
Group 6. Printing and allied industries.....	4	39	1,200,623	230,375	1,115,928
Group 7. Liquors and beverages.....	2	331	4,427,287	2,479,042	4,787,718
Group 8. Chemicals and allied products.....	6	92	516,522	233,249	419,244
Group 9. Clay and stone products.....	4	87	327,716	119,365	615,042
Group 10. Tobacco.....	2	113	4,500,403	4,339,682	8,740,516
Group 11. Miscellaneous industries.....	14	323	17,899,840	12,060,418	8,791,259

AVERAGE NUMBER OF WAGE-EARNERS AND TOTAL AVERAGE MONTHLY WAGES.

Industry group.	Total.		Men.		Women.	
	Number.	Wages.	Number.	Wages.	Number.	Wages.
All industries.....	34,659	₱757,841	27,045	₱670,270	7,614	₱87,571
Group 1. Food and kindred products.....	2,757	43,696	2,412	40,973	345	2,726
Group 2. Textiles.....	3,456	47,741	1,924	31,919	1,532	15,822
Group 3. Metal products.....	1,724	44,669	1,716	44,534	8	135
Group 4. Lumber and its manufactures.....	2,039	46,822	2,011	46,424	28	398
Group 5. Leather and its products.....	1,498	34,241	1,337	32,497	161	1,744
Group 6. Printing and allied industries.....	1,138	40,811	1,061	40,069	87	742
Group 7. Liquors and beverages.....	2,541	45,210	2,413	44,596	128	615
Group 8. Chemicals and allied products.....	1,151	26,736	1,096	25,815	55	1,421
Group 9. Clay and stone products.....	1,393	15,493	1,367	15,159	26	334
Group 10. Tobacco.....	10,150	138,112	5,223	78,923	4,927	59,189
Group 11. Miscellaneous industries.....	6,812	274,306	6,525	269,862	287	4,446

Of the total area of the islands, 2,827,704 hectares (about 7,000,000 acres), or 9.5 per cent, is agricultural land, 45.9 per cent of which is under cultivation; 1,162,108 native males, or nearly one-third of the total number of native males, are engaged in agricultural occupations. The Census Report gives a total of 815,453 farms; all but 4.8 per cent of which have an area less than 5 hectares (13.37 acres); 65.3 per cent are less than 1 hectare (2.47 acres); and 35.7 per cent are less than 0.35 hectare, or smaller than a lot 194 feet square.

While the Filipino is engaged in but few occupations, and these mostly of an individual rather than a cooperative nature, statistics show that he can not be correctly regarded as a nonworker or nonproducer. Table V is compiled from the Census Report.

TABLE V.—*Showing percentage of population engaged in gainful occupations.*

Country.	Year.	Percentage—			
		Total population.	Males.	Females.	From 10 to 14 years of age.
Philippine Islands.....	1903	43.5	57.6	29.4	16.8
Cuba.....	1899	39.6	68.2	8.8	24.6
United States.....	1900	36.3	58.7	12.8	14.8
Porto Rico.....	1899	33.1	56.9	9.9	22.4

The tools ordinarily used are of the crudest sort and modern machinery has been practically unknown. However, under proper instruction, the native has shown a fair degree of skill in operating more or less complex machinery, such as steam derricks, drills, locomotives, engines, and stone crushers.

As a measure suggestive of the physical strength of the Filipinos, Tables VI and VII have been compiled from the sources indicated. The militia age is from 19 to 59, inclusive; the voting age is from 23 upward.

TABLE VI.—*Records of medical inspections of seamen made by the United States Public Health and Marine-Hospital Service, Manila, P. I., from January, 1904, to July, 1905.*

Age.	Number measured.	Average height.	Average weight.
		<i>Feet. In.</i>	<i>Pounds.</i>
14 to 17 years, inclusive.....	25	5 1.08	96.72
18 years.....	29	5 3.43	108.43
19 years.....	31	5 4.57	118.63
20 to 23 years, inclusive.....	138	5 3.31	115.85
24 to 30 years, inclusive.....	303	5 3.51	120.30
31 to 40 years, inclusive.....	267	5 3.09	125.63
41 to 64 years, inclusive.....	153	5 3.80	134.51

This record is limited to men who were born in the Philippine Islands; it probably involves an error, since a few were doubtless Spaniards and a larger number mestizos. The average heights and weights may therefore be somewhat higher than they would have been had a more accurate determination of race been possible. In any case they are typical of the laboring classes. Table VII has been compiled from records taken of civil-service employees.

TABLE VII.—*Average weight and height of Filipinos, taken from the records of the Philippine civil service board.*

NATIVE KEEPERS AND GUARDS AT BILIBID PRISON.

Age.	Number examined.	Average height, stripped.	Average height, bare-footed.
		<i>Pounds.</i>	<i>Ft. In.</i>
19 years.....	1	100.5	5 3
20 to 22 years.....	13	113.07	5 4.17
23 to 30 years.....	15	113.57	5 3.52
31 to 40 years.....	11	114	5 4.43

NATIVE PATROLMEN IN MANILA POLICE FORCE.

18 years.....	2	114	5 5.81
19 years.....	5	119.00	5 5.98
20 to 22 years.....	27	115.59	5 5.35
23 to 30 years.....	73	119.32	5 5.61
31 to 40 years.....	40	125.80	5 5.64

NATIVE GOVERNMENT EMPLOYEES IN THE ORIENTE BUILDING.

17 years.....	4	83.75	5 1.25
18 years.....	7	86.57	5 2.78
19 years.....	9	100	5 4.32
20 to 22 years.....	21	101.09	5 3.71
23 to 30 years.....	43	105	5 3.66
31 to 40 years.....	17	104.70	5 3.08
41 to 50 years.....	2	114	5 1.02
Total.....	108		

A summation of measurements of Bilibid prisoners made by Dr. Folkmar gives the following results:

Number of men, 838; average height, weight, and age, 5 feet 3 inches, 116.8 pounds, and 31 years, respectively. The maximum and minimum ages of men measured were 55 and 20 years, respectively.

The cargadores, or pack carriers, especially of the hemp regions and of the mountains, exhibit remarkable physical development and a high degree of endurance.

The common native food is rice, corn, and dried or fresh fish, with such fruits and vegetables as may be available. It has been demonstrated by the Army, in rationing the Scouts, or native soldiers, that a material increase in strength and endurance results from a more suitable ration similar in character to the Regular Army ration. The adoption of the United States Army Scout ration among the native employees of the Mariveles quarantine station has resulted in a considerable increase in weight and a marked increase in efficiency and endurance.

With American system and methods there may be expected an increase in the use of nitrogenous foods and a proportional increase both in efficiency and in wages.

Statistics show that malarial fevers seriously interfere with the efficiency of labor gangs. Its effects can be successfully met by the use of its specific remedy, quinine, the value of which is slightly known by the native.

Cholera, usually regarded as a filth disease, is sporadic and at times epidemic in its nature. It was prevalent practically throughout the islands during the summer of 1902. It must be combated with rigid quarantine regulations, which, while effective in stamping out the disease, necessarily cause additional expense and delays in prosecuting public works. Improved and rigid sanitary measures will doubtless prevent in a large measure the future ravages of this disease.

Other tropical diseases, as leprosy and bubonic plague, are practically negligible in their effect on labor gangs. Yellow fever is at present unknown.

The board of health is thoroughly organized with an ample and efficient force. During the eleven months ending August 1, 1905, its staffs of medical inspectors had vaccinated 819,439 persons throughout the islands and the presidents of municipal boards of health had vaccinated 164,933. Vaccine units to the number of 3,034,900 were shipped to points throughout the islands. This does not include the records of the Army, Navy, and Marine-Hospital Service, or the work of private physicians. The effective work cited was of a routine nature and was not the result of an epidemic of smallpox. It has, however, practically stamped out this disease previously so prevalent.

Table VIII, from the Philippine census report, shows a comparison between the causes of death in the Philippines and the United States for the year 1902, during which cholera was pandemic.

TABLE VIII.—*Distribution of deaths in the Philippine Islands and in the United States for the year 1902, by principal causes, expressed in percentages of the total number of deaths (condensed).*

Cause of death.	Philippine Islands.	United States.	Cause of death.	Philippine Islands.	United States.
Cholera.....	31.1	—	Simple meningitis.....	0.2	1.2
Malarial fever.....	26.8	1.4	Erysipelas.....	.2	.3
Tuberculosis of the lungs.....	6.6	10.7	Rheumatism.....	.2	.5
Dysentery.....	3.7	1.1	Scarlet fever.....	.1	.6
Smallpox.....	3.4	.3	Whooping cough.....	.1	.9
Diarrheal diseases.....	3.2	3.3	Dengue.....	.1	—
Beri-beri.....	1.3	—	Cancer.....	.1	2.8
Diseases of stomach.....	1.2	1.3	Organic diseases of heart.....	.1	6.7
Bronchitis.....	.7	1.9	Pneumonia.....	.1	10.2
Tetanus.....	.6	.2	Nephritis and Bright's disease.....	.1	3.5
Influenza.....	.4	1.6	Bubonic plague.....	(*)	—
Typhoid fever.....	.4	3.4	Leprosy.....	(*)	—
Diphtheria.....	.3	1.6	Suicide.....	(*)	.5

* Represented.

Table IX shows the average density of population per square mile throughout the provinces.

TABLE IX.—*Density of population, by provinces, in the Philippine Islands.*

Province.	Area.	Total.	Per square mile.	Province.	Area.	Total.	Per square mile.
	<i>Sq. miles.</i>				<i>Sq. miles.</i>		
Albay.....	1,649.5	240,326	145.6	Moro.....	28,520.6	390,088	13.3
Ambos Camarines.....	3,540.1	239,405	67.6	Nueva Ecija.....	2,127.9	134,147	63
Antique.....	1,052.5	134,166	127.4	Nueva Viscaya.....	1,093.2	62,541	57
Bataan.....	518.9	46,787	90.1	Occidental Negros.....	3,145.5	308,272	98
Batangas.....	1,305.8	257,715	197.3	Oriental Negros.....	1,848.6	201,494	109.1
Benguet.....	908.3	22,745	25	Pampanga.....	872.6	223,754	256.3
Bohol.....	1,510.4	269,223	178.3	Pangasinan.....	1,889	442,521	234.3
Bulacan.....	985.3	223,742	231.8	Paragua.....	5,237.8	35,096	6.8
Cagayan.....	5,172.5	156,239	30.2	Rizal.....	898.5	150,923	168
Capiz.....	1,755.4	230,721	131.5	Romblon.....	572.6	52,848	92.2
Cavite.....	708.1	134,779	190.3	Samar.....	5,276.1	296,237	50.5
Cebu.....	1,938.4	663,727	337.3	Sorsogon.....	542.4	120,495	222.3
Ilocos Norte.....	1,348.3	178,965	132.8	Surigao.....	7,023.2	115,112	16.4
Ilocos Sur.....	1,739.8	239,271	137.5	Tarlac.....	1,231.3	135,107	109.7
Iloilo.....	2,102.1	410,315	195.2	Tayabas.....	5,997.8	204,749	34.1
Isabela.....	4,789.3	76,431	15.9	Zambales.....	1,589.2	59,930	37.7
La Laguna.....	686.2	148,606	223.1				
La Union.....	708.4	137,839	194.7	Total.....	115,013.7	7,415,498	-----
Lepanto-Bontoc.....	2,221.3	72,750	32.7	Manila (city).....	12.3	219,923	-----
Leyte.....	3,007.8	388,922	129.3				
Masbate.....	1,569.2	43,675	27.8	Total, Philippine Islands.....	115,026	7,635,425	66.4
Mindoro.....	4,023.7	39,582	9.8				
Misamis.....	3,346.1	175,683	52.5				

The density of population is dependent upon topographical features and resources. Along the fertile coastal plains and river valleys, where public improvements are first required, the population per unit area is from three to ten times as great as the average population per square mile.

The density of population for the United States proper is 25.6 persons per square mile. The following figures, referring to the principal agricultural regions and the principal manufacturing States, are compiled from the United States Census of 1900, and are given for comparison with those of the Philippine Islands:

Density of population of the United States.

[United States Census, 1900.]

Agricultural States.	Area.	Per square mile.	Manufacturing States.	Area.	Per square mile.
	<i>Sq. miles.</i>			<i>Sq. miles.</i>	
Arkansas.....	53,850	24.7	Connecticut.....	4,990	187.5
Indiana.....	36,350	70.1	Illinois.....	56,650	86.1
Iowa.....	56,025	40.2	Massachusetts.....	8,315	348.9
Kansas.....	82,060	18	New Jersey.....	7,815	250.3
Michigan.....	58,915	42.2	New York.....	49,170	152.6
Nebraska.....	77,510	13.9	Pennsylvania.....	45,215	140.1
Wisconsin.....	56,040	36			

The following brief tables for other countries are presented for the purpose of comparison:

Density of population of certain other countries.

Country.	Area.	Total.	Per square mile.	Country.	Area.	Total.	Per square mile.
	<i>Sq. miles.</i>				<i>Sq. miles.</i>		
Cuba.....	44,000	1,572,797	36	Java.....	50,554	26,000,000	514
Porto Rico.....	3,606	953,242	264	New Zealand.....	104,471	816,000	8
Hawaii.....	4,990	154,001	31	Sumatra.....	161,612	3,209,087	19
Japan.....	161,198	46,588,700	289	Tasmania.....	26,385	171,006	6
Jamaica.....	4,200	745,104	177				

* Taken from Census, 1899.

† Taken from International Year Book, 1901.

Under present conditions contractors and engineers located in the Philippine Islands will find it advantageous to give special instructions to American exporters shipping goods into the Islands, in order that customs regulations may be complied with and unnecessary delays avoided; that goods may be properly protected against serious deterioration from sea water and ordinary handling while in transit; and that essential parts shall not be lost for months in some way port. The American exporter, in comparison with the foreign exporter, is often seriously discredited by importers in the Philippines on account of his lack of attention to these details. He certainly exceeds all others in the careless packing of export goods.

Outside of the larger cities transportation by land is expensive on account of the lack of local facilities and the condition of highways, and the contractor will find it economical to organize and control the necessary transportation equipment. The Government is pursuing a progressive policy relative to the improvement of the highways. Water transportation has furnished the most important means of conveyance for centuries. A large percentage of the inhabitants are skilled in the use of the various small native crafts. Coastwise vessels are too limited in both size and numbers to meet the present demands; they are owned and operated mainly by local firms. Important legislation and improvements relative to coastwise commerce are now in progress and will be completed early in 1906.

The following statements are compiled from reports by the provincial supervisors, and are the average figures from thirty-six provinces. They relate only to the expenses of American officials assigned to one location for at least several months. Incidental expenses include hire of servant, laundryman, keeper of horse, etc.

U. S. currency.

Subsistence per month averages.....	\$32.00
Lodging per month averages.....	10.50
Incidentals per month average.....	15.00
Total.....	57.50

Superintendents of construction works and civil engineers in charge of field parties purchase subsistence supplies in bulk, they are quartered in tents or nipa shacks, and purchase locally fruits, vegetables, chickens, eggs, etc., whenever practicable. Subsistence expenses per month for Americans average \$27, and for native laborers about \$5.

Tables XI to XIV have been prepared from the most reliable available sources. Abnormal conditions have prevailed since the American occupation. Until recently the currency of the islands has been on a fluctuating silver standard. Fluctuations as high as 30 per cent within a few weeks have been known. The currency of the islands, however, is now firmly established on a gold standard, the unit of value being the peso, which is equivalent to 50 cents United States currency. Rentals have been excessive and all items entering into the cost of living, except clothing, have been abnormally high. During 1905 the market value of rentals and of foodstuffs is materially lower than during the period 1900 to 1905, and it can be reasonably anticipated that, with increased interisland and trans-Pacific service, and equitable tariff relations established with the United States, the previously excessive cost of living will not again prevail. The value of these tables is of importance mainly in showing the prices prevailing previous to 1905.

TABLE XI.—*Maximum and minimum wholesale prices of foodstuffs.*

[Mexican currency. From Smith, Bell & Co.]

Foodstuff.	1890.		1895.		1900.		1905.	
	Maxi- mum.	Mini- mum.	Maxi- mum.	Mini- mum.	Maxi- mum.	Mini- mum.	Maxi- mum.	Mini- mum.
Saigon rice.....picul *	\$3.50	\$2.69	\$4.00	\$3.19	\$5.55	\$4.65	\$5.00	\$4.00
Flour.....do.....	8.75	8.25	9.75	9.00	13.50	11.50	11.75	10.40
Refined sugar.....200 pounds..	12.00	7.50	10.50	8.00	16.00	14.00	13.50	10.00

* One picul equals 136 pounds.

† Warner, Barnes & Co.

TABLE XII.—Comparative retail prices of foodstuffs in Manila.

Item.	1897.	1898.	1901.	1904.	1905.
	<i>P/s.</i>	<i>P/s.</i>	<i>P/s.</i>	<i>P/s.</i>	<i>Pesos.</i>
Sugar..... arroba.....	1.82	2.50	2.94	3.50	3.00
Rice..... do.....	2.00	3.00	3.00	3.50	3.50
Spanish peas..... do.....	5.00	7.50	7.00	7.00	8.00
Beans..... do.....	2.00	3.00	4.00	4.00	3.50
Coffee..... do.....	8.00	10.00	10.00	10.00	9.00
Potatoes..... do.....	.75	5.00	1.36	2.00	1.50
Onions..... do.....	2.00	6.00	3.00	3.00	1.50
Oodfish..... do.....	4.00	6.00	7.00	8.00	6.25
Red wine..... do.....	3.00	4.00	6.00	6.00	5.00
White wine..... do.....	4.00	5.00	7.00	20.00	7.00
Sherry..... case.....	11.00	11.00	16.00	22.00	18.00
Vinegar..... arroba.....	3.00	3.50	4.50	5.50	7.00
Vinegar..... bottle.....	.37	.50	.50	.50	.40
Olive oil..... arroba.....	4.00	5.50	7.50	7.50	5.75
Olive oil..... bottle.....	1.00	1.50	1.50	1.50	.90
Alcohol (36)..... do.....	.25	.37	.37	.50	.50
Pickles..... do.....	.50	.75	.87	1.00	.50
Olives..... do.....	.50	.50	.70	1.00	.60
Olives..... firkin.....	1.00	1.50	1.50	2.00	1.25
Lard..... arroba.....	4.00	5.00	6.00	7.00	5.00
Canned butter..... pound.....	.75	1.00	1.12	1.25	.60
Kerosene..... 10-gallon case.....	4.00	5.50	5.00	5.00	3.20
Bacon..... pound.....	.37	.50	.55	.62	.45
Soda biscuit..... can.....	1.25	1.75	2.00	2.00	.50
Canned sardines..... do.....	.10	.20	.20	.50	.15
Canned fish..... do.....	.37	.50	.75	.75	.50
Canned meat..... do.....	.62	.75	1.00	1.25	.50
Canned sausage..... do.....	1.00	2.00	1.50	1.50	.45
Canned pork..... do.....	2.50	2.50	3.25	3.50	2.00
Canned sugar..... do.....	.75	.87	1.00	1.25	1.20

NOTE.—An arroba equals 25 pounds. *P/s.* is the designation for Mexican currency, and pesos for the new Philippine currency.

TABLE XIII.—Imports and exports of foodstuffs, Philippine Islands, American period.

[From Third Special Report of the Philippine Customs.]

	1901.	1902.	1903.	1904.
IMPORTS.				
Cattle, hogs, sheep.....	\$77,413	\$487,326	\$740,076	\$844,482
Breadstuffs.....	746,187	923,540	912,087	1,096,332
Cocoa, coffee, tea.....	199,899	301,859	318,834	276,593
Opium.....	619,338	619,625	721,551	770,596
Eggs.....	285,239	276,065	294,414	282,074
Malt liquors.....	1,042,594	547,517	488,131	310,411
Beef, fresh.....	19,236	31,518	82,155	204,262
Hog products:				
Hams, shoulders.....	110,744	157,663	155,130	167,181
Lard.....	92,139	120,059	185,894	262,140
Condensed milk.....	97,287	155,595	247,366	251,261
Rice.....	5,490,958	6,578,481	10,061,323	11,548,614
Spirits.....	411,859	510,258	307,681	227,578
Wines.....	347,216	300,393	258,912	266,963
Vegetables.....	328,674	686,254	412,904	432,578
Canned goods.....	112,430	286,191	233,678	282,569
Fruits.....	114,644	146,963	78,407	87,986
Olive oil.....	36,370	30,863	46,977	41,835
Onions.....	58,967	40,633	43,969	38,518
Butter.....	88,446	62,563	48,401	56,563
Fish.....	53,542	81,348	52,152	112,301
EXPORTS.				
Sugar, raw or brown.....	2,293,068	2,761,432	3,955,828	2,666,507
Coffee.....				
Rice.....				

TABLE XIV.—*Comparative cost of foodstuffs in Manila.*

	1897.	1900.	1904.	1905.
	<i>Pfs.</i>	<i>Pfs.</i>	<i>Pfs.</i>	<i>Pesos.</i>
1 pound meat without bone.....	0.25	1.50	0.60	0.30
1 sack of first-class rice.....	2.50	5.75	7.50	6.50
1 pound of pork.....	.20	.50	.70	.40
1 chicken.....	.15	.50	.80	.75
1 hen.....	.50	1.25	1.50	1.25
1 piece of bread.....	.01	.04	.04	.02
1 measure of milk.....	.06	.15	.25	.20
2 buckets of water.....	.01	.06	.06	.04
1 pound of fish.....	.12	.25	.50	.25

NOTE.—Pfs. is the designation for Mexican currency, and pesos for the new Philippine currency.

The average value of the Mexican peso for the years involved in Tables XI, XII, XIII, XIV follows:

Average value of Mexican peso in United States currency.

1890	\$0.8368
1895 .....	.552
1897 .....	.5024
1898 .....	.4711
1900 .....	.4918
1901 .....	.4872
1902 .....	.424
1903 .....	.419
1904 .....	.4671
1905 .....	.50

NOTE.—The value of local peso in above table, in terms of United States currency, was computed by Dr. E. W. Kemmerer, chief, division of the currency, on the basis of average daily sterling exchange rates in Manila, reckoning 4.8665 to the pound sterling. The new Philippine currency was adopted in 1904, one peso (₱1) being equivalent to \$0.50, United States currency.

In general the Filipino is a Malay, modified, except in the Moro, to a considerable degree by the influence of centuries of association with other races, and more particularly by the civilizing influences of the church and the Government of Spain.

Nature has freely endowed the islands with food available with a minimum of effort through the year. She does not require that provisions be made for an extended winter; nor is there a season during which some food stuffs are not procurable in the field. That thrift characteristic of inhabitants of higher latitudes is entirely lacking in the average Filipino. He has been subjected by foreign races, and through the necessity of existence he has become highly skilled in both detecting and practicing deception. He has been required to defend his family from pirates and ladrones. He has, perhaps, in past times, played the part of both. As a result he is a mass of contradictions, and is, in general, proud, hospitable, indolent, and unreliable. His family ties are strong. He is imitative and quick to learn, but his capacity remains to be determined. He may be defined as a child in whom the faculties and habits are not fully matured. As a laborer it is an absolute necessity that he receive patient, careful instruction and efficient supervision from a superintendent or foreman acquainted with his characteristics; that he clearly understands the orders given; that the demands placed upon him be within his ability; that he be instructed from the first in the right way to perform new duties, and be not required to unlearn lessons or methods previously taught. He is quick to recognize efficiency and justice in his employer, and to repose confidence in the foreigner possessing these traits. He is favorably impressed by an outward show of wealth and influence. The custom of English commercial firms upon entering new fields of operations is to construct ample warehouses and residences for their representatives. These buildings are generally the most substantial and best furnished in the town. They could be easily fortified to resist attacks by mobs. This plan not only provides for the security and

efficiency of the representatives of the firm, but it pays as an advertisement as well—it creates in the minds of the surrounding inhabitants confidence, and inspires a desire to trade with a firm of such evident wealth and power.

The employer of a considerable number of men for a period of several months must provide for the sanitation, subsistence, amusements, and religion of the employee and his family.

A brief description of the employees' settlement at the quarries of the Atlantic, Gulf and Pacific Company will clearly illustrate this point. This firm has under prosecution the contract for the Manila breakwater and harbor dredging, the total cost of which will be approximately \$4,000,000. The quarries are located on the westerly shore of Manila Bay, about 25 miles from the harbor works. The employees consist principally of about an equal force of Tagalo and Pampangans. The contractors have an experienced and efficient superintending force. They have provided pure water for the settlement and enforced regulations relating to sanitation and policing; gambling is prohibited inside of the houses. About 700 employees are engaged; 150 houses have been built for their families; and material for a church has been furnished, the labor having been provided by the settlement, and the erection superintended by the contractor. A cockpit and dance hall were built, and the time of attendance regulated; the children have been provided with a school, and the services of a native teacher have been secured through the Bureau of Education; a store for the supplies demanded by the settlement has been established, at which necessary goods are sold at practically cost prices, and the paymaster, if desired, acts as banker for the more thrifty employees. The cost of these provisions for the needs and pleasures of the employees has been comparatively small by reason of the fact that the materials of construction have been available locally. The amount of common sense and the practical knowledge of the native characteristics shown by this company has been large. As a result of the above-mentioned provisions, and by a process of elimination, selected laborers have been secured for long periods of service, and they have been trained to considerable efficiency in lines requiring semiskilled labor. Mr. H. Krusi, vice-president of the company in charge of this work, states that native labor is entirely satisfactory. In view of large contracts under advertisement, he declines to give at present detailed information on the efficiency or unit output per day of the native laborers.

A large portion of the data presented relative to the facility in securing labor, its efficiency, and wages paid applies to Manila and its vicinity. The best information available on labor throughout the provinces may be secured from an examination of the reports of the provincial supervisors, who are, as a rule, trained civil engineers, and whose official duties require them to organize and superintend all public works in the provinces. They are generally engaged on projects financed with insular, municipal, or provincial funds.

Wages in Manila and vicinity and in the hemp regions average about one peso (50 cents) per day. The average rate through the provinces is somewhat less than one-half peso; during the planting and harvesting seasons labor may be scarce, and difficult to secure at somewhat higher prices, but lower rates prevail during the remainder of the year.

In general it may be noted that the hire of labor, as well as the purchase of local material, can be accomplished more readily when small rather than large quantities are required; the difficulties to the Filipino contractors in the organization and prosecution of the larger projects are materially increased, and they refuse to undertake such contracts.

Experience in handling the larger projects has not yet been acquired, although there is a favorable tendency to a more successful meeting of such demands. In other words, laborers in small numbers can be readily secured for short periods of time; laborers in large numbers for continuous service are difficult to secure, and require tact and skill in providing with such conveniences, amusements, and home life as are necessary to hold the laborers for long periods. When such local amusement or relaxation is not provided the Filipino laborer leaves his work at frequent intervals to visit his home and friends, for fiestas, and for the harvesting and planting of crops.

The following abstracts from the reports of the supervisors for the past fiscal year on the question of unskilled labor are typical; it is probable that over 60,000 different native laborers have been employed during the past year by these officials:

"Nueva Ecija.—During the past year I have had little trouble in securing labor whenever desired. During the rice-harvesting season it is more difficult to

obtain labor than at other seasons, as laborers receive more in proportion for harvesting rice than at other work. As a rule, it is difficult to obtain carabaos and carts for public work; and during about eight months of the year it is practically impossible to get them at any reasonable figure—this during rice planting and harvesting seasons. To meet these conditions the province has purchased carts, American mules and wagons, and I have made log wagons and other vehicles for use on public works.

"A marked improvement is noticeable in semiskilled native labor, if properly directed for any considerable length of time. * * * I do not think that it would be questioned that labor conditions at the present time are superior to those at any previous period since American occupation.

"*Batangas*.—Natives were almost entirely employed on all public works. * * * Economic conditions in the province are such at present that no difficulty was encountered in securing the necessary number of laborers at the rate (40 cents) specified. It is evident, however, that within the course of a year or two agriculture will have recuperated to such an extent that wages will be considerably higher as the demand for labor increases.

"*Rizal*.—Hundreds of laborers found employment at Fort McKinley as painters, carpenters, and ordinary laborers at good wages, and at times I had difficulty in getting labor for my road work. The lowest wage paid for labor at Fort McKinley is 80 cents per day, but the men are paid off but once a month. By paying the men weekly I am enabled to get labor at 60 cents, and they will quit work at 80 cents to work for me at 60 cents, in order that they may get their money more quickly.

"*Tayabas*.—While it is difficult to procure a large force of laborers and hold them together, still small gangs of 100 to 200 men can usually be kept at work except during the season of sowing and harvesting the rice crop; at such times the force dwindles down, and it is only by constant exertion that enough men can be secured to keep the work going. However, I never have as yet been obliged to shut down on account of not having sufficient men with which to do something. It is a matter of record that the people of Tayabas Province do not care to work on the roads, this probably being due to the fact that there is usually enough work to be found in looking after the numerous coconut plantations.

"The best way to keep even such small gangs together is to pay them frequently, say, at least every two weeks; then have pay day on Sunday morning early; most of the men will spend their money during the day, and having no means of subsistence will return to work on Monday, as they are at least assured of their daily rice by so doing. These laborers, under intelligent foremen, accomplish a good day's work—left to themselves under native *capataces*, they are not to be depended on for one moment."

The following abstracts are taken from the report of Maj. L. W. V. Kennon, United States Army, in charge of the Benguet road construction:

"The Filipino makes a tolerably good workman when trained and properly supervised. The class of work required on the Benguet road was new to him and he went at it awkwardly enough at the start. Each laborer was patiently shown by a foreman how to use his tools and how to accomplish most with the least effort. Most of them attained a fair degree of efficiency and soon became good workmen.

* * * * *

"It may be said that after becoming inured to the work, the Filipino, considering his wage and ration, was the most economical laborer employed on the road for ordinary work. Skilled supervision is essential, however. The opinion is ventured that the Philippine Islands may be developed by native labor alone under suitable conditions. Time, tact, patient instruction, and fair dealing will accomplish much; the personal equation enters very largely into the problem. * * *

"The great variety of workmen employed on the road gave opportunity for a comparison of the relative working value of the several races. The American or European, by reason of his strength, and especially by the intelligent direction of his strength, is superior to all other workmen and could accomplish more in a given time than any other. Americans were, on their merits, selected generally as foremen of the various grades.

"Spaniards were among the very best laborers employed—steady, constant, industrious, and hard working always.

"The Japanese were superior workmen. They were intelligent and worked well when watched. They were fearless and active on cliff work. They fur-

nished many carpenters and stone masons; most of them could be called upon to lay walls or to do stonework of almost any kind.

"The Chinese did not turn out well and the 500 which reported were soon reduced to about 200. The majority were confirmed opium smokers and of little value as laborers and were discharged. The selected few that remained were good workers and more adaptable than Filipinos. * * *

A few concrete examples may be of value in illustrating the labor problem. The deputy surveyor of customs, Manila, in charge of lighterage, submits the following statement:

"My experience has been that the Filipinos make good laborers, but only on condition that a very liberal number of foremen and superintendents be put over them, and that white men be employed as chief superintendents to do all the brain work, such as planning, directing, and other executive duties. Filipino foremen of a grade of intelligence several degrees above the laborers are necessary in liberal numbers, but these also have their limitations when it comes to head work and anything out of a routine.

"The average force in the arrastre division consisted of—

	U. S. currency.
150 laborers.....per day--	\$0. 45
4 stevedores (3 Filipinos, 1 Chinese).....per month--	20. 00-25. 00
6 stationary engineers.....do--	17. 00
2 locomotive engineers.....do--	21. 00-25. 00
2 firemen.....do--	10. 00
3 machinists.....do--	12. 50-25. 00
1 carpenter (Chinese).....do--	25. 00
14 warehousemen.....do--	15. 00
12 openers and packers.....do--	15. 00

"The superintendency for this force was one American at \$1,600 per year, and three Spanish citizens of the islands at salaries of \$900, \$840, and \$600, respectively.

"The unskilled laborers are paid each week; the skilled each month. About one-fourth of the unskilled laborers are quite regular, and another fourth fairly so; the others come and go. Three-fourths to seven-eighths can not read or write. They generally lack intelligence. If more intelligent laborers could be procured, better wages could with economy be paid. It is not considered that the laborer at 45 cents gold a day is cheap. American laborers at three times the wages would be no more expensive; neither is the skilled labor cheap. The amount of work done is not large per man compared to American standards, and the large amount of superintendence necessary, comparatively speaking, does not make this class of labor specially cheap. There is no trouble in securing laborers. Half of my force is Tagalog and half Pampangan. They are kept separate. The two do not affiliate, and there is no danger of a combination and strike as happened two years ago when all were Tagalogs."

Mr. D. M. Carman, of the firm of Carman & Co., Manila, is one of the first Americans to handle comparatively large forces of natives. He states as follows:

"During a period of over five years I had in my employ, and much of the time under my immediate observation, a large number of native and Chinese laborers. This number ranged from 300 to about 2,000, and included stevedores, wharfmen, warehousemen, teamsters, lightermen, launch captains, engineers, machinists, carpenters, masons, bookkeepers, freight checkers, superintendents, and managers. There are no especial arrangements for housing or feeding any of these.

"It was our custom to work a few gangs of Chinamen by the side of the Filipinos. Thus we were enabled to compare the character and the amount of work done by each.

"At the custom-house we invariably paid the Chinamen a few cents per day more than the native, as that was necessary to secure their services. While I was always convinced that the natives gave us as much work for the money paid them as did the Chinamen, we retained the latter as a check on the former. With the exception of the coal handlers and the carpenters the Filipinos gave as good satisfaction as the Chinamen. They were not strong enough to carry the heavy baskets of coal continuously and were not trained to do carpentry work. The engineers, machinists, and captains of launches were very satisfactory, some of them remaining almost constantly at work for over

four years with few holidays and no vacations. One engineer and one captain were on one launch for nearly four years without the loss of a month's time. In the early days of American occupation there was great difficulty in keeping men at work holidays, of which there were 157 in the year, and it was almost impossible to induce them to work overtime, but after the first few months that trouble almost entirely ceased. I believe that the following incident had more to do with the somewhat sudden change in this particular than anything else. Noticing that the petty bosses were in the habit of striking men when they did not obey promptly, or when they were at all insolent, I gave notice that any man who struck an employee would be discharged.

"Shortly after issuing this one of the most important overseers hit a man and was immediately discharged. From that time there seemed to be a marked change in the feelings of the men and we seldom had trouble in inducing them to work overtime and holidays. I mention this because I have become firmly convinced that one of the secrets of securing reasonably efficient and willing service from Filipinos is the proper treatment of them.

"I employed but few white foremen, and some of the best bosses were natives. One of these has been in charge of the work on the custom-house wharf for several years, never so far as I know having been away from his post a day, except for a week or so during a misunderstanding with the Spanish foreman, in which the latter was at fault.

"In order to indicate the possibilities of development in the Filipinos, I desire to refer to a man who began to work at 40 pesos a month, and within three years managed one large department at a compensation of \$250 gold per month. This man did his work with a faithfulness, honesty, and competency that was exceptional.

"While it is true that the Filipinos are not physically able to do as much or as hard work as similar classes of workmen in the United States, it is my belief that as much light work can be gotten out of them for a dollar as can be secured for a like sum from any ordinary set of men anywhere."

Mr. H. A. Belden, manager of J. G. White & Co., has completed the construction and equipment of the Manila Electric Railway system, and with few exceptions is employing native conductors and motormen. He states:

"We have had to employ more foremen than we would have found necessary in the United States, but the cost has been nowhere what we expected and for which we provided in our estimates. We had been told that it would take a half dozen Filipinos to do the work we would expect to be done by an American laborer. Results have shown, however, that the ratio of efficiency is about three to one.

"We had figured on securing what Chinese and Japanese laborers we could pick up around Manila. But we decided to first give the Filipinos a thorough trial, and, as I said, the results have been excellent. We employed a few Chinamen for doing the riveting work on the power house—work at which they are supposed to excel—but we have discharged them and have employed natives in their places. Even here the natives prove themselves far the better workmen."

In response to an inquiry from the civil government the following statement was submitted by Mr. Krusi, to whose work reference has been previously made:

(1) We believe that Filipino labor can successfully be used. We are employing about 1,000 Filipinos, which is a practical demonstration that this statement is not a theory.

(2) To employ successfully Filipino labor is, to the American employer of labor, a new business which has to be learned. If he can not learn it, he can not do business in the Philippine Islands.

(3) In general the Filipinos have to be taught to work. This requires a considerable proportion of intelligent, high-grade American foremen and mechanics.

(4) The way to keep the Filipino laborer permanently in one's employ is to arrange his surroundings so that he is better off and more contented there than anywhere else. This we have attained by means of providing homes for the Filipinos and their families, also amusements, including Sunday fiestas and schools where their children may be educated.

(5) We are opposed to the introduction of the Chinese. The only argument is that it may somewhat expedite the development of the resources of the islands. This temporary advantage is, we believe, overbalanced and overwhelmed by the ultimate injury to both the Americans and natives in the islands.

(6) We believe that the greatest need of the islands is the abolition of the Dingley tariff as far as it applies to the Philippines. We want the American market, not the Chinese labor.

The above two firms are to-day the largest representative American contractors doing business in the islands, and their projects have been described in previous issues of the *Engineering News*.

Mr. H. L. Higgins, general manager of the Manila Railway, a line having a 34-foot gauge, and extending from Manila to Dagupan, a distance of about 120 miles, is constructing about 82 miles of extension to the present system. The constructing as well as the maintenance and operating forces are composed entirely of Filipinos, except the superintendency. The permanent works require the services of about 1,300 men. Mr. Higgins has had no serious difficulty in securing laborers for new works. He states that on the new works the average period of service is about one month; that pay days occur weekly, and that wages average 50 centavos, Philippine currency, per day. When the work is remote from the base of supplies a commissary is established which sells necessities at prices generally under the market; no goods are sold except to laborers, and they are under no obligation to buy. No shelter has been provided laborers except when company buildings were available. Mr. Higgins estimates that in medium excavation the Filipino will handle 15 cubic meters (19.5 cubic yards) per day; that the output per dollar expenditure compares favorably with the output of American labor, and that under improved methods and proper instruction the output will increase more rapidly than wages. On account of difficulty in securing Filipino labor in 1890, 500 Chinese were employed, at a loss in quantity and quality of work accomplished as compared with Filipino laborers. Native laborers are free from drunkenness and do not wantonly destroy property. They require efficient supervision.

The native is desirous of being his own "boss," and small contracts or section work can be let to advantage. On such work he shows perhaps double the efficiency shown on day labor. It is not uncommon for him to sleep during the middle of the day, and to work for several hours at night, either by the light of bonfires or during the brilliant moonlight nights. Ordinary tools are generally furnished by the company; otherwise he uses a sharpened bamboo stick for a pick or bar and loads the material with his hands into small baskets, which are carried on the head, or he may throw the dirt with his bare hands from pit to spoil bank. His methods and tools are of the crudest types, but he is rapidly appreciating the utility of the simpler tools. On such small section work the entire family—men, women, and children—take part.

The various departments of the military have employed large numbers of natives and their published reports are in general favorable to the economical prosecution of works requiring semiskilled and unskilled laborers as compared with similar American laborers. The comparative efficiency is reported as approximating 3 native to 1 American laborer. When laborers of other nationalities have been employed, they have been replaced with native laborers, not on account of a governmental policy, but for economical reasons.

In the past it has been difficult to secure laborers from other nearby localities on account of the then existing caciquism or the generally despotic control of a barrio by a man who arbitrarily exercised the rights of a petty king. While this condition is still in evidence, it is being rapidly overcome by American policies.

Filipino labor is in a period of transition. It needs the application of American ideas, methods, energy, and supervision. The advances already made are encouraging to those actually engaged in solving the labor problem in the Philippines. That it will be successfully solved through the employment of Filipinos rather than of people from neighboring countries is not doubted by practical observers on the ground.

The bureau of engineering has employed thousands of laborers throughout the islands on road and bridge work. During the past year it has been possible to extend the period between pay days from one day to two weeks, and service has been extended from a period of a few days into months. The efficiency of laborers is increasing and a knowledge of ordinary tools extending. Semiskilled labor has been satisfactorily developed. In many localities labor gangs have been secured for work in remote municipalities or other provinces. Laborers of other nationalities have not been employed in sufficient numbers to justify a general comparison. Of the 40,000 Chinese in the islands few are available for ordinary laborers; they come to the islands for definite purposes, they are the pioneers of their nation, they seek to be traders and retailers, and begin in the smallest ways; they persistently retain national characteristics

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and methods, and avoid supervision by other nationalities. Japanese are not now available in quantities sufficiently large to meet the needs of extensive contract work.

Specific information on the efficiency of native semiskilled and unskilled laborers has been difficult to secure. They seek clerical positions as soon as ability to read and write has been acquired. As typewriters they equal Americans when copying from a plain copy. As tracers they excel the American draftsman in neatness, and perform about one-third as much work; at present they can not make an accurate structural drawing from a rough sketch. They are efficient when deftness of hand and patience is required, but fall when designing and forethought are necessary. They are good messengers, and, after proper instruction, efficient rodmen and surveymen. The principal difficulty is that they can not be depended upon for continuous service in the field month after month. In the office, in the vicinity of their homes, regular continuous service is given, and considerable success attained in developing the educated native in the solution of the simpler problems involving logarithms.

The following tabulations have been compiled from actual records of work in the city of Manila and in the provinces, and are the averages on both government and private works. The wages quoted apply to Manila and its immediate vicinity, and are expressed in Philippine currency.

Average day's work and wages of laborers in Manila.

Class of work.	Daily wage.	Average day's work of one laborer.
Rock excavation (adobe).....	₱1.00	1.1 cubic meters.
Earth excavation.....	1.00	2.1 cubic meters.
Back filling.....	1.00	6.3 cubic meters.
Cement curbs.....	1.50	2.1 linear meters.
Cement sidewalks (by hand).....	1.50	1.8 square meters.
Crushing stone (by hand).....	1.00	1.1 cubic meters.
Laying wooden-block pavement in concrete.....	1.00	0.67 square meter.
Trenching (shallow).....	1.00	1.8 cubic meters.
Laying pipe.....	1.00	4.1 meters.
Unloading and storing merchandise.....	.80	4.9 tons.
Typesetting.....	2.20	3,000 ens.
Engraving.....	4.50	3 name plates.
Bookbinding.....	1.00	1,000 sheets.
Field riveting.....	.80	125 per day.
Cigar makers, hand.....	.....	100 per day.

An analysis of these items shows that the actual cost of labor for work accomplished is in general the same as in the United States, and that the relative efficiency of native, as compared with American, laborers averages about three to one.

The following data are compiled from the records of the city of Manila and represent the averages for the work specified over a period of one year:

Average cost of labor.

Street cleaning, average of all kinds.....	per 1,000 square meters..	₱0. 155
Stone block.....	do.....	.23
Wooden block.....	do.....	.22
Macadam.....	do.....	.105
Sprinkling with cans and hose.....	do.....	.10
Collecting and cleaning pails.....	per 1,000 pails.....	45.00
Garbage.....	per 1 ton.....	.48
Incinerating garbage.....	do.....	.61

For the above items eight hours constitute a day's work. The labor scale is:

American foreman.....	₱6.00-7.00
Native foremen, street cleaning.....	1.20
American teamsters, pail system.....	4.00
Native teamsters, collecting garbage.....	1.30
Native labor, unskilled.....	.60-1.00

On new construction for the Manila Railway Company, a typical labor gang on rock excavation, after the rock had been blasted into fragments varying in size up to 4 cubic meters (5.3 cubic feet), loaded 18 dump cars having a capacity

of 4½ cubic meters in one and one-half hours. The gang consisted of 1 American, 2 native foremen, and 76 laborers, 60 of which were actually engaged in loading and 15 in breaking the fragments too large to lift by hand. The loading was done with shovels, the rock averaged 10 feet from the edge of the car, and the car platform was about 5 feet above the bottom of the pit.

The wage scale was:

American foreman	₱5.00
Native foreman	1.00
Native laborers .....	.80

The rock handled was a soft "adobe" rock, easily fractured by pick or sledge and weighing about 100 pounds per cubic foot.

Mr. John Gibson, of the Gibson saw and planing mills, submits the following statements regarding rough sawing from the log: Eight men at ₱1.56 per day and 25 men at ₱0.80 per day saw 12,000 feet B. M. at a cost of ₱2.71 per 1,000; 3 men at ₱1.00 and 4 men at \$0.80 resaw 20,000 feet B. M. at a cost of ₱0.3 per 1,000; 1 man at ₱1 and 6 men at ₱0.80 plane in one-day 17,000 feet B. M. at a cost of ₱0.34 per 1,000. He states that in general the cost of mill-work is about the same as in the United States, but that the laborer is more satisfactory, as he is steadier and more tractable.

The period since American occupation has been fruitful with heavy problems. It has been filled with difficulties due to the abnormal conditions following active warfare and insurrection. The problems confronting Congress were new, and the theories advanced untried by any country.

American motives had not been trusted by the Filipinos. Criticisms both from within and outside of our borders have been based on perverted motives rather than helpful ones. The political obstructionist has been convinced in a large measure; a fluctuating currency has been banished; radical changes in governmental and in business policies have occurred. It has been a critical period of vital importance to both of the interested countries. Neither fully understood the other. It will be impossible for such adverse conditions to exist again simultaneously. The uncertain policy of the United States has been changed to definiteness, and the future policy has been clearly stated by the statesmen who visited the islands during the past summer, and existing laws will be amended along the lines of a clearly defined policy whenever necessary, and future laws based thereon.

The cost of living and the expenses connected with the prosecution of public works have been abnormal. The tendency toward a firmer market and reasonable profits during the present year has been marked. It may be properly concluded that ample labor material, capable of considerable development under efficient supervision, is available, and that, in general, although the prosecution of large public works in the Philippines involve several conditions not applicable to similar work in the United States, they can be accomplished with practically equal economy at the present time, and that with a more extended knowledge of existing conditions on the part of the employer and more experience on the part of the employee such works can be accomplished in the near future with somewhat greater economy.

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